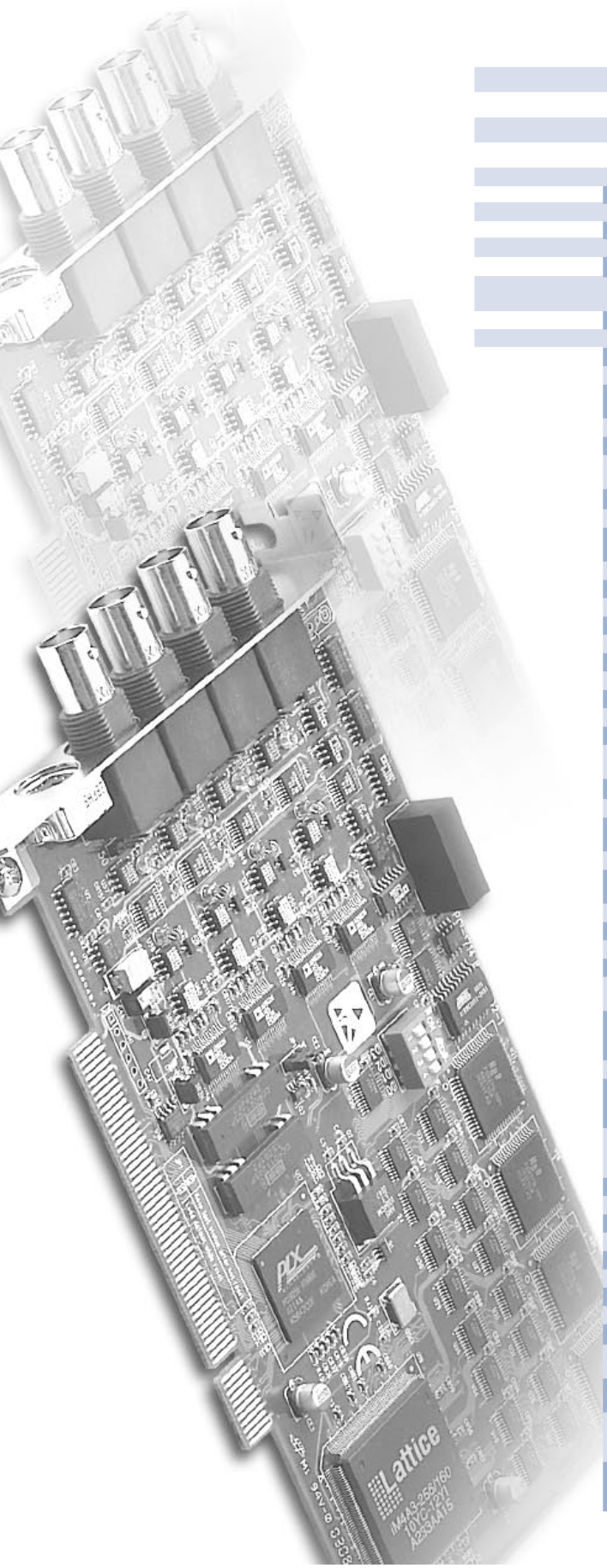
16 Data Acquisition Boards



Data Acquisition and Control Tutorial & Software		*16-2*
ActiveDAQ Pro Introduction		*16-4*
Glossary		*16-6*
Selection Guide		*16-8*
Multifunction Cards		
PCI-1710U/UL **PCI-1710HGU**	100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card 100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card with High Gain	*16-18*
PCI-1711U/UL	Entry-level 100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card	*16-20*
PCI-1712/L	1 MS/s, 12-bit, 16-ch PCI Multifunction Card	*16-22*
PCI-1716/L	250 kS/s, 16-bit, 16-ch PCI Multifunction Card	*16-24*
PCI-1718HDU	100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card	*16-26*
PCI-1741U **PCI-1742U**	200 kS/s, 16-bit, 16-ch Universal PCI Multifunction Card 1 MS/s, 16-bit, 16-ch Universal PCI Multifunction Card	*16-28*
PCL-711B	40 kS/s, 12-bit, 8-ch ISA Multifunction Card	*16-30*
PCL-812PG	30 kS/s, 12-bit, 16-ch ISA Multifunction Card	*16-31*
PCL-818HD/HG **PCL-818L**	100 kS/s, 12-bit, 16-ch ISA Multifunction Card 40 kS/s, 12-bit, 16-ch ISA Multifunction Card	*16-32*
Analog I/O Cards		
PCIE-1744 (New)	30 MS/s, 12-bit, Simultaneous 4-ch Analog Input PCI Express Card	*16-34*
PCI-1714U **PCI-1714UL**	30 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card 10 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card	*16-35*
PCI-1713U	100 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card	*16-36*
PCI-1715U	500 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card	*16-37*
PCI-1747U	250 kS/s, 16-bit, 64-ch Analog Input Universal PCI Card	*16-38*
PCL-813B	25 kS/s, 12-bit, 32-ch Isolated Analog Input ISA Card	*16-39*
PCI-1720U	12-bit, 4-ch Isolated Analog Output Universal PCI Card	*16-40*
PCI-1721	12-bit, 4-ch Analog Output PCI Card with 16-ch Digital I/O	*16-41*
PCI-1723	16-bit, 8-ch Analog Output PCI Card with 16-ch Digital I/O	*16-42*
PCI-1724U	14-bit, 32-ch Isolated Analog Output Universal PCI Card	*16-43*
PCI-1727U	14-bit, 12-ch Analog Output Universal PCI Card with 32-ch Digital I/O	*16-44*
PCL-727	12-bit, 12-ch Analog Output ISA Card with 32-ch Digital I/O	*16-45*
PCL-726 **PCL-728**	12-bit, 6-ch Analog Output ISA Card with 32-ch Digital I/O 12-bit, 2-ch Isolated Analog Output ISA Card	*16-46*
Digital I/O & Counter Cards		
PCI-1735U	64-ch Digital I/O and Counter Universal PCI Card	*16-47*
PCI-1737U **PCI-1739U**	24-ch Digital I/O Universal PCI Card 48-ch Digital I/O Universal PCI Card	*16-48*
PCI-1751	48-ch Digital I/O and 2-ch Counter PCI Card	*16-49*
PCI-1753 **PCI-1753E**	96-ch Digital I/O PCI Card 96-ch Digital I/O Extension Card for PCI-1753	*16-50*
PCI-1755	80 MB/s, 32-ch Digital I/O PCI Card	*16-51*
PCI-1757UP	24-ch Digital I/O Low Profile Universal PCI Card	*16-52*
PCL-720+	64-ch Digital I/O and Counter ISA Card	*16-53*
PCL-722	144-ch Digital I/O ISA Card	*16-54*
PCL-724 **PCL-731**	24-ch Digital I/O ISA Card 48-ch Digital I/O ISA Card	*16-55*
PCI-1730U **PCI-1733** **PCI-1734**	32-ch Isolated Digital I/O Universal PCI Card 32-ch Isolated Digital Input PCI Card 32-ch Isolated Digital Output PCI Card	*16-56*
PCI-1750	32-ch Isolated Digital I/O and 3-ch Counter PCI Card	*16-57*
PCI-1752U **PCI-1754** **PCI-1756**	64-ch Isolated Digital Output Universal PCI Card 64-ch Isolated Digital Input PCI Card 64-ch Isolated Digital I/O PCI Card	*16-58*
PCI-1758UDI **PCI-1758UDO** **PCI-1758UDIO**	128-ch Isolated Digital Input Universal PCI Card 128-ch Isolated Digital Output Universal PCI Card 128-ch Isolated Digital I/O Universal PCI Card	*16-59*
PCI-1760U	8-ch Relay and 8-ch Isolated Digital Input Universal PCI Card with 10-ch Counter/Timer	*16-60*
PCI-1761	8-ch Relay and 8-ch Isolated Digital Input PCI Card	*16-61*
PCI-1762	16-ch Relay and 16-ch Isolated Digital Input PCI Card	*16-62*
PCL-725	8-ch Relay and 8-ch Isolated Digital Input ISA Card	*16-63*
PCL-735	12-ch Relay ISA Card	*16-64*
PCI-1780U	8-ch, 16-bit Counter/Timer Universal PCI Card	*16-65*
PCL-836	6-ch, 16-bit Counter/Timer ISA Card GBIP Card	*16-66*
PCI-1671UP	IEEE-488.2 Interface Low Profile Universal PCI Card	*16-67*
PC/104 & PCI-104 DAQ Modules		
PCM-3810I (New) **PCM-3813I**	250 kS/s, 12-bit, 16-ch Multifunction PCI-104 Module 100 kS/s, 12-bit, 32-ch Isolated Analog Input PCI-104 Module	*16-68*
PCM-3718H/HG/HO **PCM-3724**	100 kS/s, 12-bit, 16-ch Multifunction PC/104 Module 48-ch Digital I/O PC/104 Module	*16-69*
PCM-3725 **PCM-3730** **PCM-3780**	8-ch Relay and Isolated Digital Input PC/104 Module 16-ch Isolated Digital I/O PC/104 Module 2-ch Counter/Timer with 24-ch Digital I/O PC/104 Module	*16-70*
PCM-3730I **PCM-3753I** **PCM-3761I**	32-ch Isolated Digital I/O PCI-104 Module 96-ch Digital I/O PCI-104 Module 8-ch Relay and 8-ch Isolated Digital Input PCI-104 Module	*16-71*

Data Acquisition and Control Tutorial & Software

PC-based Data Acquisition (DAQ) System Overview

Because industrial PC I/O interface products have become increasingly reliable, accurate, and affordable in the last few years, PC-based data acquisition and control systems are nowadays widely used in industrial and laboratory applications such as monitoring, control, data acquisition and automated testing.

It requires know-how of electrical and computer engineering to select and build a data acquisition (DAQ) and control system that actually does what you want. This tutorial gives a brief introduction to what data acquisition and control systems do and how to configure them. Here, we cover:

- Transducers and Actuators
- Signal Conditioning
- Data Acquisition and Control Hardware
- Getting Started

Transducers and Actuators

A transducer converts temperature, pressure, level, length, position, etc. into voltage, current, frequency, pulses or other signals.

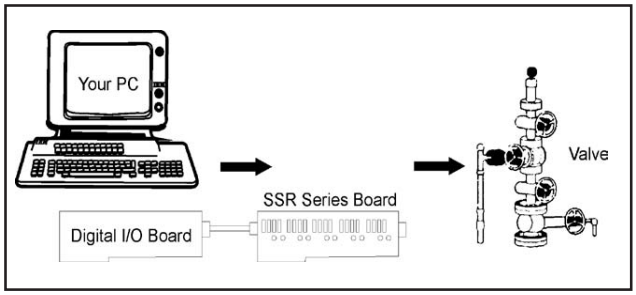
Thermocouples, thermistors and resistance temperature detectors (RTDs) are common transducers for temperature measurements. Other types of transducers include flow sensors, pressure sensors, strain gauges, load cells and LVDTs, which measure flow rate, pressure variances, force or displacement.

An actuator is a device that activates process control equipment by using pneumatic, hydraulic or electrical power. For example, a valve actuator can open and close a valve to control fluid rates.

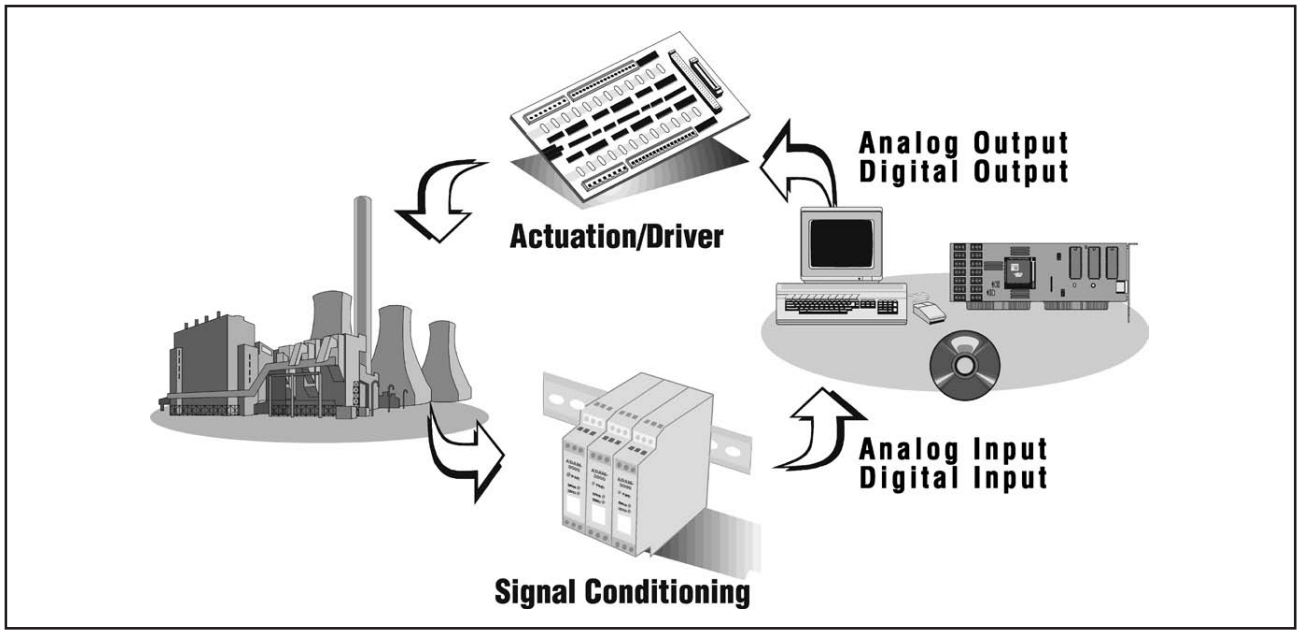
Signal Conditioning

Signal conditioning circuits improve the quality of signals generated by transducers before they are converted into digital signals by the PC's data-acquisition hardware. Examples of signal conditioning are signal scaling, amplification, linearization, cold-junction compensation, filtering, attenuation, excitation, common-mode rejection, and so on.

One of the most common signal conditioning functions is amplification. For maximum resolution, the voltage range of the input signals should be approximately equal to the maximum input range of the A/D converter. Amplification expands the range of the transducer signals so that they match the input range of the A/D converter. For example, a x10 amplifier maps transducer signals that range from 0 to 1 V into the range 0 to 10 V before they go into the A/D converter.



Using digital I/O and SSRs to open and close a valve



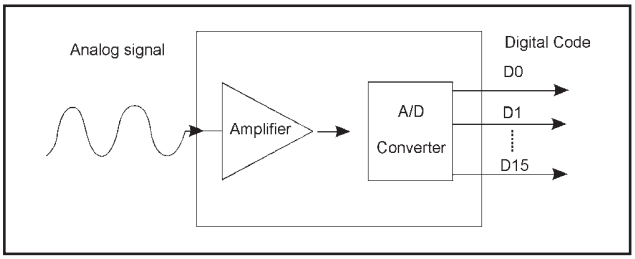
The layout of a typical PC-based data acquisition system

Data Acquisition & Control Hardware

Data acquisition and control hardware generally performs one or more of the following functions: analog input, analog output, digital input, digital output and counter/timer functions. This section will discuss each function and list some considerations that are important when you select a data acquisition and control system.

Analog Inputs (A/D)

Analog to digital (A/D) conversion changes analog voltage or current levels into digital information. The conversion is necessary to enable a computer to process or store the signals.

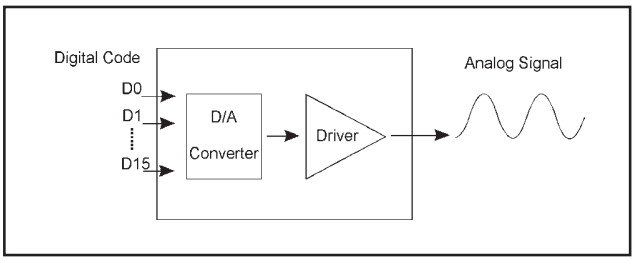


The most significant criteria when selecting A/D hardware are:

1. Number of input channels
2. Single-ended or differential input signals
3. Sampling rate (in samples per second)
4. Resolution (usually measured in bits of resolution)
5. Input range (specified in full-scale volts)
6. Noise and nonlinearity

Analog Outputs (D/A)

The opposite of analog to digital conversion is digital to analog (D/A) conversion. This operation converts digital information into analog voltage or current. D/A devices allow a computer to control real-world events.



Analog output signals may directly control process equipment. The process can give feedback in the form of analog input signals. This is referred to as a closed loop control system with PID control. Analog outputs can also be used to generate waveforms. In this case, the device behaves as a function generator.

Digital Inputs and Outputs

Digital input/output functions are useful in applications such as contact closure and switch status monitoring, industrial On/Off control and digital communications.

Counter/Timer

A counter/timer can be used for event counting, flowmeter monitoring, frequency counting, pulse width measurement, time period measurement, and so on.

Getting Started

Advantech: The Source For What You Need

Advantech manufactures data acquisition hardware and software for measurement, monitoring and applications control. The following guide is provided to help you choose components for your data acquisition system.

Step 1: Know Your Fundamental Goal

Decide whether your DAQ system will be used primarily for measurement, monitoring, control, or analysis. Know the data requirements of your process, and know the number of data collection points in your system. Know the required data collection speed, the sampling rate, the type of measurement, the voltage or current being produced, the desired accuracy and the output resolution at each data collection point. Finally, know the timing of events in your system, and any special environmental conditions that exist.

Step 2: Hardware Selection

Select the hardware required to achieve your fundamental goal. Advantech provides plug-in boards for Analog-to-Digital, Digital-to-Analog, Digital I/O needs. Both ISA and PCI bus products are available. Your hardware selection should be based on five major criteria:

1. Number and types of channels
2. Differential or single-ended inputs
3. Resolution
4. Speed
5. Software compatibility with hardware

Step 3: Accessory Selection

Most applications require additional accessories which are available as separate items. These include:

1. Expansion peripherals to add channels to your system
2. Cables, signal conditioners and external boxes such as screw terminals or BNC accessories

Step 4: Software Selection

More than any other single factor, software will determine your system start-up time, as well as its effectiveness, suitability for your application, and ease of modification.

Three major criteria should determine the choice of software:

1. Operating system used
2. User programming expertise
3. Software compatibility with hardware

ActiveDAQ Pro Introduction

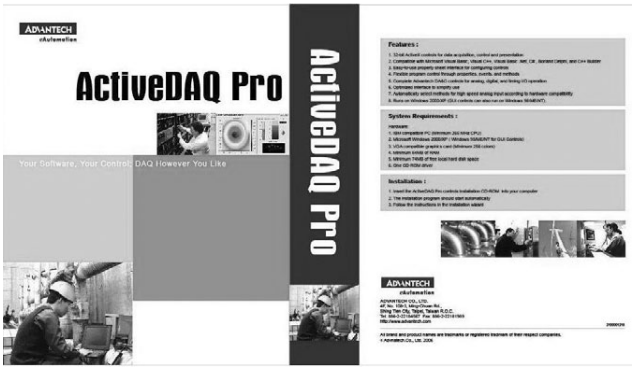
What is ActiveDAQ Pro ?

ActiveDAQ Pro is a collection of ActiveX controls for performing I/O operations within any compatible ActiveX control container, such as Visual Basic, Delphi, etc. You can easily perform the I/O operations through properties, events and methods. With ActiveDAQ Pro, you can perform versatile I/O operations to control your Advantech devices.

The ActiveDAQ Pro package contains the following components:

- Advantech ActiveDAQ Pro Device Control: Enumerate all Advantech devices, direct I/O operation.
- Advantech ActiveDAQ Pro AI Control: Retrieve data from Advantech AI device.
- Advantech ActiveDAQ Pro AO Control: Export data to Advantech AO device.
- Advantech ActiveDAQ Pro Digital I/O Control: Digital I/O operation.
- Advantech ActiveDAQ Pro Thermo Control: Retrieve temperature by thermocouple measurement.
- Advantech ActiveDAQ Pro Counter Control: Counter input signal.
- Advantech ActiveDAQ Pro Pulse Control: Pulse signal output.

You can use these ActiveX controls in any development tool that supports them, including Microsoft Visual C++, Microsoft Visual Basic, Borland C++ Builder, Borland Delphi and Microsoft Visual Studio .NET.



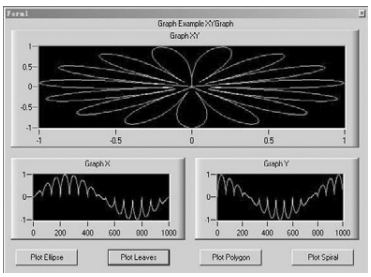
What's New in ActiveDAQ Pro ?

In the latest version of the ActiveDAQ series: ActiveDAQ Pro, efforts have been made to improve on the technical aspects and to provide a clear-cut mode of operation, as explained in the following summary:

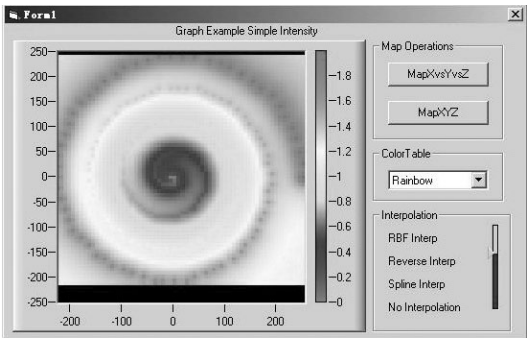
Graphic User Interface Control Components

Advantech ActiveDAQ Pro GUI control collection consists of abundant of graphic user interface (GUI) control components, which enable users to conveniently and quickly build graph display modules for data acquisition so as to supervise the changing status of the object. ActiveDAQ Pro GUI control collection also helps users easily develop prototype vision applications in an interactive environment without programming. These control components include:

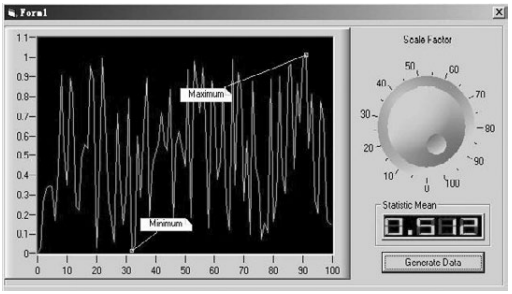
- **Button Control:** It offers various display styles (2D and 3D) and is a Boolean control that displays an on or off state (True or False).
- **Graph Control:** This control provides abundant graph display functions, which enable the user to display data of various sources simultaneously.



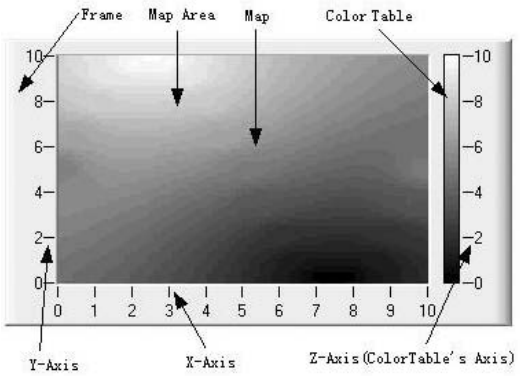
- **Intensity Control:** It offers two-dimensional display and simple interpolation for scattered 3D data points so that the user can conveniently check the intensity variation trend of scattered 3D data points.



- **Knob Control:** It is a circular data controlling control that provides various graph styles and can be used to display one or more values on the same interface.



- **LED Control:** This control provides data display and editing functions with the seven-segment nixie tube mode.
- **NumEditor Control:** This control provides the user with the functions of data displaying and editing. After the Formatstring has been chosen or defined by the user, the values of the control will be adjusted automatically according to the FormatString and displayed in the text edit box.
- **Slider Control:** It is a linear data controlling control that provides various graph styles. A Slider control can be used to set or display one or more values.



Supports All Advantech DAQ Devices with High Speed Functions

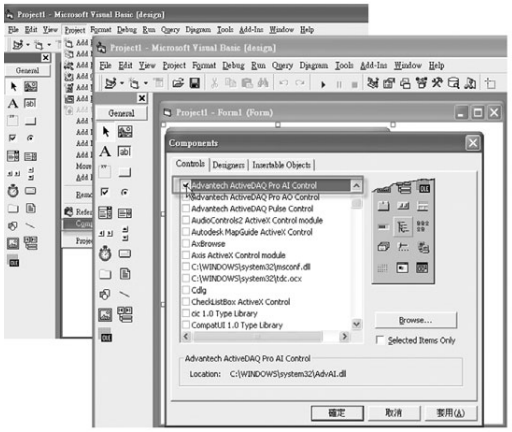
ActiveDAQ Pro now fully supports all Advantech DAQ cards and functions with complete high speed data acquisition, including AI (analog input), AO (analog output), DI/O (digital input/output) and counter cards. These high speed functions are preformed by interrupt and DMA data transfer.

Easy-to-use Property Sheet Interface for Configuring Controls

The property page will offer selections which will give easy access to all settings and eliminate unnecessary programming. Programming will only be required in specialized situations.

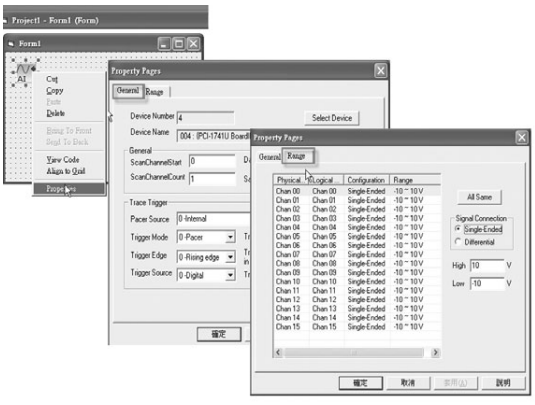
Independent Operation of Controls

ActiveDAQ Pro offers total independent control operation, needing no support from other existing controls.



Uses Known Physical Properties

Physical properties like voltage, current and frequency can now be directly applied by the user and will automatically be reassigned to the data needed by GainCode and sampling rate. Making these changes has ensured that ActiveDAQ Pro has become much more user friendly.



Straightforward User Interface

The new version has become less-hardware dependent and it has relied more on intuition during the user interface. During the redesigned process, the target was to decrease the development difficulties. It has become easier for both entry level and advanced level users to manage.

Uses Optional Lists Instead of Direct Input

Now lists are provided with values which remain limited over various processes. This option is much more convenient to input and will eliminate a large portion of the direct data input.

Default Settings for Immediate Execution

Proper default settings have now been added to all methods and properties. That means quicker execution for the user, which will offer a prompt response.

Properties and Parameters are Chosen Automatically

When the user opts for some specific methods in ActiveDAQ Pro it can result automatically in appropriate properties and parameters. For example, ActiveDAQ Pro control can automatically determine an appropriate data transferring method to perform the data acquisition. (Software, interrupt and DMA transfer)

Parameter Check-up and Correction

Each input parameter has to be within a certain range. As a result it has to have check-up to ensure legitimacy. In most cases the user will be notified and in others there will be an automatic correction.

Better Defined Error Messages and Diagnostic Guide

ActiveDAQ Pro offers clear error messages description and diagnostic guides for all return errors.

Supports All Widely Known Development Platforms

ActiveDAQ Pro support Microsoft Windows 2000 and Windows XP operation system.

As with the previous version, ActiveDAQ 1.6x, it continues to support all widely known development platforms based on ActiveX technolygy. These platforms include Microsoft Visual Basic, Visual C++, Visual Basic.Net, Visual C#, Borland C++ Builder and Delphi.

System Requirements

- PC with at least a 266 MHz or higher microprocessor
- Microsoft Windows 2000/ XP/ Vista
- VGA compatible graphics card, supporting at least 256 colors
- Minimum 64 MB of RAM
- 74 MB of free local hard disk space
- One CD-ROM driver

Ordering Information

- **PCLS-ADPSTD** ActiveX Control-based Software for DAQ

Glossary

Accuracy

Accuracy is the deviation of a measurement from a known standard. Accuracy is normally specified in percent.

ADC - Analog-to-Digital Converter

ADC is used to convert DC voltage from transducers into digital words (data). The voltage representing a temperature, pressure, flow, pH, or speed and must converted to a digital word before it can be passed to an intelligent device like a computer.

Amplifier

Amplifiers are used to boost the analog level (voltage) of the signal.

AO - Analog Output

The D/A converter performs the opposite function of an A/D converter. It interprets commands from the computer and outputs the proper DC voltage or current. The output stays at this output level until the computer tells the D/A converter to output a new value.

Auto Calibration

The built-in auto-calibration circuitry corrects gain and offset errors in analog input and analog output channels thereby eliminating the need for external equipment and user adjustments.

Automatic Channel/Gain/SD*/BU* Scanning

Advantech's DAQ cards with this function feature an automatic channel/gain/SD/BU scanning circuit. This circuit controls multiplexer switching during sampling in a way that is more efficient than software implementation. Onboard SRAM stores different gain, SD and BU values for each channel. This combination lets users perform multi-channel high-speed sampling with different gain, SD and BU values for each channel.

*Note: SD: Single-Ended/Differential; BU: Bipolar/Unipolar

BoardID Switch

BoardID DIP switch helps defines each card's unique identity when multiple identical PCI cards have been installed in the same computer. The BoardID switch is very useful when you build your system with multiple identical PCI cards. With the correct BoardID switch settings, you can easily identify and access each card during hardware configuration and software programming.

C/T - Counter/Timer

The counter card can be used to sense the presence or absence of a voltage, much like digital input card. The counter is used to count the number of electronic pulses (totalize), the duration of the pulse (pulse width), or the rate of pulses (frequency) coming out of an external device.

Channel-freeze

The channel-freeze function can be enabled either in dry contact or wet contact mode (selected by the onboard jumper). When the channel-freeze function is enabled, the last status of each digital output channel will be safely kept for emergency use. Moreover, you can enable this function through software as it is useful in software simulation and testing program.

Common Mode Noise

Common mode noise most often results when the ground potential between the measuring instrument and the device being measured are different. The difference in grounds results in a ground loop, a current flowing through ground and the low lead. Once this current appears in the low lead wire it will cause a voltage because the wire has some resistance. The longer the lead, the more lead resistance and greater the voltage error.

TIP : To reduce common mode noise, use a guarded voltmeter. Tie the guard to the low side of the device being measured. This will shunt any ground loop currents away from the high and low measurement wires.

DI - Digital Input

A digital input card is used to determine whether an external device is on or off by sensing the presence or absence of a voltage. The DI can only report ON/OFF status and not the value of the voltage on each channel (sometimes called a bit). The bit is considered to be ON if the voltage exceeds a certain value.

Digital cards usually feature 8, 16, or 32 channels. They can monitor a number of devices at the same time. For example, a digital card can be attached to a single operator panel to sense the position of switches on that panel.

Digital Filter

The digital filter function is used to eliminate glitches on input data and reduce the number of changes to examine and process. The filter blocks pulses that are shorter than the specified timing interval and passes pulses that are twice as long as the specified interval. Intermediate-length pulses that are longer than half of the interval, but less than the interval, may or may not pass the filter depending on your settings.

DMA - Direct Memory Access

A method of transferring data from or to memory at a high rate without involving the CPU. DMA is the hardware/software technique that allows the highest speed transfer of data, to or from random memory (RAM) . Given the potentially more expensive hardware, DMA can provide the means to read or write data at precise times without restricting the microprocessor' tasks. For example, one system under DMA control can read or write any combination of analog, digital or counter/timer data to or from RAM at rates up to 360KB/second. This is accomplished without taking time from the other tasks of the microprocessor. The amount of time required to respond to a DMA request is much smaller than the one required to service an interrupt. This makes the goal of foreground/background operation, at high speed, possible.

DO - Digital Output

The digital output card interprets a command from the computer and outputs a high or low voltage on each of its channels (bits). It is commonly used to turn on/off small lights or to send digital words to machinery.

FSR - Full Scale Range

FSR stands for the difference between the largest positive and negative voltages which a AI channel can measure or a AO channel can output.

Gain - Magnitude Ratio

For a linear system or element, the ratio of the magnitude (amplitude) of a steady-state sinusoidal output relative to the causal input; the length of a phasor form the origin to a point of the transfer locus in a complex plane.

GPIB - General Purpose Interface/Instrument Bus

A standard for IEEE-488 communication interface.

Interrupt Data Transfer

Interrupts provide a mean of tightly controlling the timing of events, while allowing the processing of more than one task. Multitasking systems are also known as "foreground/background" systems. One way of putting data acquisition in the background is to relegate it to an interrupt routine. The clock or external timing signal, rather than being polled continuously, is used to generate an interrupt to the computer. Whenever the interrupt occurs, the computer suspends current activity, and executes an "interrupt service routine". The interrupt service routine in this case might be a short program which acquires one frame of data, and stores it in memory. The computer can perform other operations in the foreground while collecting data in the background. Whenever a clock tick or external interrupt occurs, the computer will automatically stop the foreground processing, acquire the data, and then resume where it left off.

The reaction speed of the interrupt system is much higher than that of a polling loop. Speed, for a PC, is about 10 kHz ~ 30 kHz in the interrupt mode.

Isolation Protection

Isolation circuits are used to protect sensitive measurement circuitry from interference currents or voltages. These circuits are useful when the external voltage (from a transducer) is separeted from the measurement hardware.

Keeping The Output Values After System Reset

When the system is hot reset (power is not shut off), the Advantech's DAQ cards with this function can either retain the last digital (or analog) output values, or return to its default configuration, depending on jumper setting. This practical function eliminates danger caused by misoperation during unexpected system reset.

LSB - Least Significant Bit

Onboard FIFO Memory

FIFO is the abbreviation of "First-In, First-Out". It functions as a "buffer" memory, which plays an important role in the data acquisition device. You can either enable or disable the interrupt request of the FIFO buffer. While the interrupt request for FIFO is enabled, you can further specify whether the interrupt request will be sent whenever one sampling takes place or when the FIFO buffer is half saturated. Advantech's data acquisition cards with onboard FIFO memory enables a continuous high-speed data transfer with more predictable performance on Windows systems.

Onboard Programmable Counter

Advantech's multifunction cards provide a programmable counter to generate a pacer trigger for the A/D conversion. The counter chip is an 82C54 or equivalent, which includes three 16-bit counters on a 10 MHz clock. One counter is used as an event counter for counting events coming from the input channels. The other two are cascaded together to make a 32-bit timer for a pacer trigger.

Optical Isolators

Optical isolators are used with digital circuitry to shield high voltage signals from affecting digital circuitry.

PCI Mastering Data Transfer

Advantech's high-speed DA & C cards support PCI-Bus mastering DMA for high-speed data transfer and gap-free analog input and analog output. By setting aside a block of memory in the PC, the DA&C cards performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Plug & Play Function

Advantech DAQ cards fully comply with the PCI spectication Rev 2.2 and thus are Plug & Play devices. During card installation, it is virtually unnecessary to set any jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupts are conveniently taken care of by the Plug & Play function.

Polling

Polling is the simplest method for detecting a unique condition and then taking action. This involves a software loop that contains all the required measurement, analysis, decision-making algorithms and planned actions. The data acquisition program periodically tests the system's clock or external trigger input to sense a transition. Whenever a transition occurs, the program then samples each of the inputs and stores their values in a "frame". A frame is simply a list that contains the values representing the specified inputs at a given time. The frames can be stored in RAM, disk or other types of memory. Each time the program senses a clock "tick", the inputs are scanned and converted, and a new frame is added to memory. In this mode, generic computers can support an acquisition rate of about 10 kHz.

In addition, the PC is continuously busy when the polling loop is under operation, and hence no other tasks can be serviced. When an application cannot tolerate these characteristics, interrupt techniques may be needed.

Programmable Power-Up States

With this function, all output lines are user-configurable for logic high or logic low when the system is powering up. User-configurable power-up states are useful for ensuring that the data acquisition card powers up in a known state. Power-up states are programmed in the EEPROM through the driver. The default settings are all set to 0.

PWM - Pulse Width Modulation

Pulse width modulation (PWM) technology is widely used for industrial applications such as measurement, motor control, power control and so on. It offers a simple way for digital control logic to create an analog equivalence. By using Advantech's high-resolution counter cards, the duty cycle of a square wave could be modulated to encode some specific analog signal levels so they can be used to control many electronic devices.

Resolution

Resolution is the smallest change that a measurement instrument can sense. Resolution is normally specified in bits.

S.E. Input - Single Ended Input

A single-ended configuration is the best when you need analog measurements against respect to a common external ground. This configuration is also appropriate when there is no practical way to bring both a signal ground and an analog ground (AGND) back to the system's input terminals.

Shielding

An extra layer of conductive material surrounding a wire to prevent external electrical signals from interfering with the signal on the wire.

SPDT Relay - Single-Pole Dual-Throw Relay

SPST Relay - Single-Pole Single-Throw Relay

TTL - Transistor Transistor Logic

Watchdog Timer

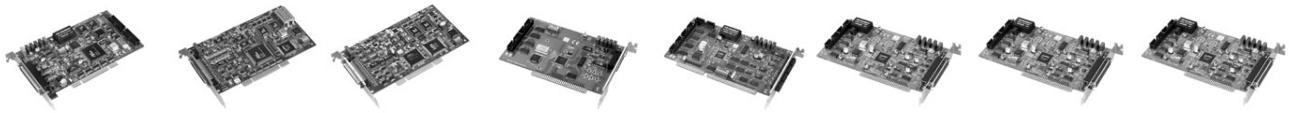
The watchdog timer is a software-configurable feature used to set critical outputs to safe states in the event of a software failure. It will activate if there is a loss of communication between the application and the data acquisition card. If the card does not receive a watchdog clear software command within the interval time specified for the watchdog timer, the outputs go to a user-defined safe state and remain in that state until the watchdog timer is disabled and new values are written by the software.

After the watchdog timer expires, the card ignores any writes until the watchdog timer is disabled. Users can set the watchdog timer timeout period through WDT register to specify the amount of time that must elapse before the watchdog timer expires. The counter on the watchdog timer is configurable up to (232-1) x 100 ns (approximately seven minutes) before it expires.

Analog I/O & Multifunction Card Selection Guide

Category			Multifunction				
Bus			PCI				
Model			PCI-1710U/UL	PCi-1710HGU	PCI-1711U/UL	PCI-1712/L	PCI-1716/L
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE	16 SE/8 Diff.	16 SE/8 Diff.
		Onboard FIFO	4,096 samples	4,096 samples	1,024 samples	1,024 samples	1,024 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s	1 MS/s	250 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓
	Trigger Mode	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	✓	-
		Advanced Trigger	-	-	-	✓	-
	Data Transfer Mode	Software	✓	✓	✓	✓	✓
		DMA	-	-	-	Bus-mastering	Bus-mastering
Analog Output	Resolution		12 bits	12 bits	12 bits	12 bits	16 bits
	Channels		2 (PCI-1710U only)	2 (PCI-1710HGU only)	2 (PCI-1711U only)	2 (PCI-1712 only)	2 (PCI-1716 only)
	Onboard FIFO		-	-	-	32,768 samples	-
	Output Range (V)		0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10
	Output Rate		Static update	Static update	Static update	1 MS/s	Static update
	DMA transfer		-	-	-	✓	-
Digital I/O	Input Channels		16	16	16	16 (shared)	16
	Output Channels		16	16	16		16
Timer/Counter	Channels		1	1	1	3	1
	Resolution		16 bits	16 bits	16 bits	16 bits	16 bits
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-
Auto Calibration			-	-	-	✓	✓
BoardID Switch			✓	✓	✓	-	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓
Windows Vista DLL Driver			✓	✓	✓	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			✓	✓	-	-	-
Linux Driver			✓	✓	✓	✓	✓
ActiveDAQ/ActiveDAQ Pro			✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓
KW IPC-33 Driver			✓	✓	-	-	✓
Page			16-18	16-18	16-20	16-22	16-24

* All channels should be set to the same range.
** SS: Single DMA channel, Single A/D channel scan; SM: Single DMA channel, Multiple A/D channel scan



Multifunction							
PCI			ISA				
PCI-1718HDU	PCI-1741U	PCI-1742U	PCL-711B	PCL-812PG	PCL-818L	PCL-818HD	PCL-818HG
12 bits	16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	8 SE	16 SE	16 SE/8 Diff	16 SE/8 Diff	16 SE/8 Diff
1,024 samples	1,024 samples	1,024 samples	-	-	-	1,024 samples	1,024 samples
100 kS/s	200 kS/s	1 MS/s	40 kS/s	30 kS/s	40 kS/s	100 kS/s	100 kS/s
0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25*	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	-	-	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01
±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625*	±10, 5, 2.5, 1.25,0.625	±5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005
✓	-	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓
-	-	Bus-mastering	-	SS**	SM**	SM**	SM**
12 bits	16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
1	1	2	1	2	1	1	1
-	-	-	-	-	-	-	-
0 ~ 5, 0 ~ 10	±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±10	0 ~ 5, 0 ~ 10, ±10
Static update	Static update	Static update	Static update	Static update	Static update	Static update	Static update
-	-	-	-	-	-	-	-
16	16	16	16	16	16	16	16
16	16	16	16	16	16	16	16
1	1	1	-	1	1	1	1
16 bits	16 bits	16 bits	-	16 bits	16 bits	16 bits	16 bits
10 MHz	10 MHz	10 MHz	-	2 MHz	10 MHz	10 MHz	10 MHz
-	-	-	-	-	-	-	-
-	✓	✓	-	-	-	-	-
✓	✓	✓	-	-	-	-	-
175 x 100	175 x 100	175 x 100	175 x 100	185 x 100	155 x 100	185 x 100	185 x 100
DB37	68-pin SCSI	68-pin SCSI	3 x 20-pin	5 x 20-pin	DB37	DB37	DB37
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-
-	-	-	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-
16-26	16-28	16-28	16-30	16-31	16-32	16-32	16-32

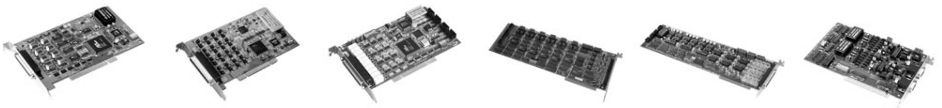
Analog I/O & Multifunction Card Selection Guide

Category			Multifunction				Analog Input	
Bus			PC/104			PCI-104	PCIe	PCI
Model			PCM-3718H	PCM-3718HG	PCM-3718HO	PCM-3810I	PCIE-1744	PCI-1713U
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	12 bits	12 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	4 SE	32 SE/16 Diff.
		Onboard FIFO	-	-	1,024 samples	4,096 samples	32,768 samples	4,096 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s*	250 kS/s	30 MS/s	100 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1 0 ~ 0.1, 0 ~ 0.01	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1, 0.5	±10, 5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓
	Trigger Mode	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	-	✓	-
		Advanced Trigger	-	-	-	✓	✓	-
	Data Transfer Mode	Software	✓	✓	✓	✓	✓	✓
		DMA	SS**	SS**	SS**	-	Bus-mastering	-
Analog Output	Resolution		-	-	12 bits	12 bits	-	-
	Channels		-	-	1	2	-	-
	Onboard FIFO		-	-	-	-	-	-
	Output Range (V)		-	-	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	-	-
	Output Rate		-	-	Static update	250 kS/s	-	-
	DMA transfer		-	-	-	-	-	-
Digital I/O	Input Channels		16 (shared)	16 (shared)	16 (shared)	16 (shared)	-	-
	Output Channels						-	-
Timer/ Counter	Channels		1	1	1	3	-	-
	Resolution		16 bits	16 bits	16 bits	16 bits	-	-
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	-	-
Isolation Voltage			-	-	-	-	-	2,500 V_{DC}
Auto Calibration			-	-	-	✓	-	-
BoardID Switch			-	-	-	-	-	-
Dimensions (mm)			96 x 90	96 x 90	96 x 90	96 x 90	175 x 100	175 x 100
Connector			2 x 20-pin	2 x 20-pin	2 x 20-pin	50-pin/26-pin box header	4 x BNC	DB37
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓	✓
Windows Vista DLL Driver			-	-	-	-	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			✓	✓	✓	-	-	✓
Linux Driver			✓	✓	✓	-	-	✓
ActiveDAQ/ActiveDAQ Pro			✓	✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓	✓
KW IPC-33 Driver			-	-	-	-	-	-
Page			16-69	16-69	16-69	16-68	16-34	16-36

* 80 kHz on Pentium 4-based (or upper) system
** SS: Single DMA channel, Single A/D channel scan

Analog Input						Analog Output	
PCI				ISA	PCI-104	PCI	
PCI-1714U	PCI-1714UL	PCI-1715U	PCI-1747U	PCL-813B	PCM-3813I	PCI-1720U	PCI-1721
12 bits	12 bits	12 bits	16 bits	12 bits	12 bits	-	-
4 SE	4 SE	32 SE/16 Diff.	64 SE/32 Diff.	32 SE	32 SE/16 Diff.	-	-
32,768 samples	8,192 samples	1,024 samples	1,024 samples	-	1,024 samples	-	-
30 MS/s	10 MS/s	500 kS/s	250 kS/s	25 kS/s	100 kS/s	-	-
-	-	0 ~10, 0 ~ 5 0 ~ 2.5, 0 ~1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-
±5, 2.5, 1, 0.5	±5, 2.5, 1, 0.5	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	-	-
✓	✓	✓	✓	✓	✓	-	-
✓	✓	✓	Pacer/Software	Software	✓	-	-
✓	✓	-	-	-	-	-	-
✓	✓	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	-	-
Bus-mastering	Bus-mastering	Bus-mastering	Bus-mastering	-	-	-	-
-	-	-	-	-	-	12 bits	12 bits
-	-	-	-	-	-	4	4 (Waveform Output)
-	-	-	-	-	-	-	1,024 samples
-	-	-	-	-	-	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
-	-	-	-	-	-	Static update	10 MS/s
-	-	-	-	-	-	-	Bus-mastering
-	-	-	-	-	-	-	16 (shared)
-	-	-	-	-	-	-	1
-	-	-	-	-	-	-	16 bits
-	-	-	-	-	-	-	10 MHz
-	-	2,500 V_{DC}	-	500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-
✓	✓	-	✓	-	-	-	✓
✓	✓	✓	✓	-	-	✓	✓
175 x 100	175 x 100	175 x 100	175 x 100	219 x 100	96 x 90	175 x 100	175 x 100
4 x BNC	4 x BNC	DB37	68-pin SCSI	DB37	40-pin	DB37	68-pin SCSI
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	-	-	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	✓	-	✓	✓	-
-	-	-	-	✓	-	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-
16-35	16-35	16-37	16-38	16-39	16-68	16-40	16-41

Analog I/O & Multifunction Card Selection Guide



Category			Analog Output					
Bus			PCI			ISA		
Model			PCI-1723	PCI-1724U	PCI-1727U	PCL-726	PCL-727	PCL-728
Analog Input	General Spec.	Resolution	-	-	-	-	-	-
		Channels	-	-	-	-	-	-
		Onboard FIFO	-	-	-	-	-	-
		Sampling Rate	-	-	-	-	-	-
	Input Ranges	Unipolar Inputs (V)	-	-	-	-	-	-
		Bipolar Inputs (V)	-	-	-	-	-	-
		Configurable Per-Channel	-	-	-	-	-	-
	Trigger Mode	Pacer/Software/ External Pulse	-	-	-	-	-	-
		Analog Slope	-	-	-	-	-	-
		Advanced Trigger	-	-	-	-	-	-
	Data Transfer Mode	Software	-		-	-	-	-
		DMA	-	-	-	-	-	-
Analog Output	Resolution		16 bits	14 bits	14 bits	12 bits	12 bits	12 bits
	Channels		8	32	32	6	12	2
	Onboard FIFO		-	-	-	-	-	-
	Output Range (V)		±10, 0 ~ 20 mA, 4 ~ 20 mA	±10, 0 ~ 20 mA	±10, 0~20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
	Output Rate		Static update	Static update	Static update	Static update	Static update	Static update
	DMA transfer		-	-	-	-	-	-
Digital I/O	Input Channels		16 (shared)	-	16	16	16	-
	Output Channels			-	16	16	16	-
Timer/ Counter	Channels		-	-	-	-	-	-
	Resolution		-	-	-	-	-	-
	Max. Input Frequency		-	-	-	-	-	-
Isolation Voltage			-	1,500 V_{DC}	-	-	-	500 V_{DC}
Auto Calibration			✓	-	-	-	-	-
BoardID Switch			✓	✓	✓	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	337 x 112	337 x 112	185 x 120
Connector			68-pin SCSI	DB62	2 x 2-pin, DB37	4 x 20-pin	2 x 20-pin, DB37	2 x DB9
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓	✓
Windows Vista DLL Driver			✓	✓	✓	-	-	-
Windows 2000/XP SDK			✓	✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			-	✓	-	-	-	-
Linux Driver			-	✓	✓	✓	✓	✓
ActiveDAQ/ActiveDAQ Pro			✓	✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓	✓
KW IPC-33 Driver			-	-	-	-	-	-
Page			16-42	16-43	16-44	16-46	16-45	16-46

Digital I/O & Counter Card Selection Guide

Category			Non-Isolated Digital I/O						
Bus			PCI						
Model			PCI-1735U	PCI-1737U	PCI-1739U	PCI-1751	PCI-1753	PCI-1755	PCI-1757UP
TTL DI/O	Input Channels		32	24 (shared)	48 (shared)	48 (shared)	96 (shared)	32 (shared)	24 (shared)
	Output Channels		32						
	Output Channel	Sink Current	24 mA @ 0.5V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.44 V	24 mA @ 0.5V	24 mA @ 0.5 V
		Source Current	15 mA @ 2.0V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	24 mA @ 3.76 V	15 mA @ 2.0V	24 mA @ 3.7 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	3	-	3	-
	Resolution		16 bits	-	-	16 bits	-	16 bits	-
	Max. Input Frequency		10 MHz	-	-	10 MHz	-	10 MHz	-
Advanced Function	Pattern Match		-	-	-	-	✓	✓	-
	Change of State		-	-	-	-	✓	✓	-
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		-	-	-	-	-	✓	-
	Output Status Read Back		✓	✓	✓	✓	✓	-	✓
	Dry/Wet Contact*		-	✓	✓	✓	✓	-	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	120 x 65
Connector			5 x 20-pin	1 x 50-pin	2 x 50-pin	68-pin SCSI	100-pin SCSI	100-pin SCSI-II	1 x DB25
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓	✓	✓
Windows Vista DLL Driver			✓	✓	✓	✓	✓	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			✓	-	-	-	-	-	-
Linux Driver			✓	-	-	✓	✓	-	✓
ActiveDAQ/ActiveDAQ Pro			-	✓	✓	✓	✓	✓	✓
Labview I/O Drivers			-	✓	✓	✓	✓	✓	✓
KW Win33 Driver			-	-	-	-	-	-	-
Page			16-47	16-48	16-48	16-49	16-50	16-51	16-52

* Dry/wet contact can be mixed at the same time within one group.

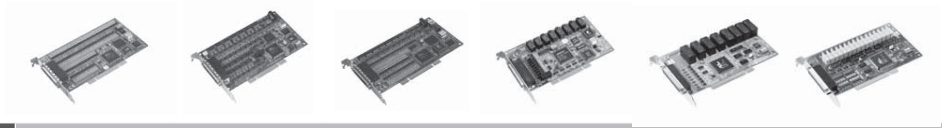
Digital I/O & Counter Card Selection Guide

Category			Non-Isolated Digital I/O					
Bus			ISA				PC/104	PCI-104
Model			PCL-720+	PCL-722	PCL-724	PCL-731	PCM-3724	PCM-3753I
TTL DI/O	Input Channels		32	144 (shared)	24 (shared)	48 (shared)	48 (shared)	96 (shared)
	Output Channels		32					
	Output Channel	Sink Current	24 mA @ 0.5 V	24 mA @ 0.5 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.5 V	24 mA @ 0.4 V
		Source Current	15 mA @ 2.0 V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.0 V	15 mA @ 2.4 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	-	-	-
	Resolution		16 bits	-	-	-	-	-
	Max. Input Frequency		1 MHz	-	-	-	-	-
Advanced Function	Pattern Match		-	-	-	-	-	✓
	Change of State		-	-	-	-	-	✓
	BoardID Switch		-	-	-	-	-	-
	Channel-Freeze Function		-	-	-	-	-	-
	Output Status Read Back		-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-
Dimensions (mm)			185 x 100	334 x 100	125 x 100	185 x 100	96 x 90	96 x 90
Connector			5 X 20-pin	6 x 50-pin	1 x 50-pin	2 x 50-pin	2 x 50-pin	4 x 50-pin
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓	✓
Windows Vista DLL Driver			-	-	-	-	-	-
Windows 2000/XP SDK			✓	✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			-	-	-	-	✓	✓
Linux Driver			-	✓	✓	-	-	-
ActiveDAQ/ActiveDAQ Pro			✓	✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓	✓
KW Win33 Driver			-	-	-	-	-	-
Page			16-53	16-54	16-55	16-55	16-69	16-71

* Dry/wet contact can be mixed at the same time within one group.

Isolated Digital I/O						
PCI						
PCI-1730U	PCI-1733	PCI-1734	PCI-1750	PCI-1752U	PCI-1754	PCI-1756
16	-	-	-	-	-	-
16	-	-	-	-	-	-
24 mA @ 0.5 V	-	-	-	-	-	-
15 mA @ 2.4 V	-	-	-	-		
16 (Sink)	32 (Sink)	-	16 (Sink)	-	64 (Sink)	32 (Sink)
2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}
5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	5 ~ 50 V_{DC}	-	10 ~ 50 V_{DC}	10 ~ 50 V_{DC}
16 (Sink)	-	32 (Sink)	16 (Sink)	64 (Sink)	-	32 (Sink)
2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}
5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}
200 mA	-	200 mA	200 mA	200 mA	-	200 mA
-	-	-	1	-	-	-
-	-	-	16 bits	-	-	-
-	-	-	1 MHz	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
✓	✓	✓	-	✓	✓	✓
✓	-	-	-	✓	-	✓
✓	-	✓	-	✓	-	✓
✓	✓	-	✓	-	-	-
175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
1 x DB37 4 x 20-pin	1 x DB37	1 x DB37	1 x DB37	100-pin SCSI	100-pin SCSI	100-pin SCSI
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	-	-	✓	✓	✓	-
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	-	✓	✓	✓
16-56	16-56	16-56	16-57	16-58	16-58	16-58

Digital I/O & Counter Card Selection Guide



Category			Isolated Digital I/O					
Bus			PCI					
Model			PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO	PCI-1760U	PCI-1761	PCI-1762
TTL DI/O	Input Channels		-	-	-	-	-	-
	Output Channels		-	-	-	-	-	-
	Output Channel	Sink Current	-	-	-	-	-	-
		Source Current	-	-	-	-	-	-
Isolated DI/O	Input	Channels	128	-	64	8 (Sink)	8 (Sink)	16 (Sink)
		Isolation Voltage	2,500 V_{RMS}	-	2,500 V_{DC}	2,500 V_{DC}	3,750 V_{DC}	2,500 V_{DC}
		Input Range	5 ~ 25 V_{DC}	-	5 ~ 25 V_{DC}	4.5 ~ 12 V_{DC}	5 ~ 50 V_{DC}	10 ~ 50 V_{DC}
	Output	Channels	-	128	64	6 x Form A 2 x Form C	4 x Form A 4 x Form C	16**
		Isolation Voltage	-	2,500 V_{RMS}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}
		Output Range	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	0.5A @ 120 V_{AC} 1A @ 30 V_{DC}	3A @ 250 V_{AC} 3A @ 24 V_{DC}	0.5A @ 120 V_{AC} 1A @ 30 V_{DC}
		Max. Sink Current	-	90 mA	90 mA			
Timer/ Counter	Channels		-	-	-	Up CTR for DI 2 x PWM	-	-
	Resolution		-	-	-	16 bits (2,500 Isolation)	-	-
	Max. Input Frequency		-	-	-	500 Hz for Up CTR	-	-
Advanced Function	Pattern Match		-	-	-	✓	-	-
	Change of State		-	-	-	✓	-	-
	BoardID Switch		✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		-	-	-	-	-	✓
	Output Status Read Back		-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	1 x DB37	1 x DB37	1 x DB62
Windows 2000/XP DLL Driver			✓	✓	✓	✓	✓	✓
Windows Vista DLL Driver			✓	✓	✓	✓	✓	✓
Windows 2000/XP SDK			✓	✓	✓	✓	✓	✓
Win CE 5.0/6.0 Driver			✓	✓	✓	-	✓	-
Linux Driver			✓	✓	✓	✓	✓	✓
ActiveDAQ/ActiveDAQ Pro			✓	✓	✓	✓	✓	✓
Labview I/O Drivers			✓	✓	✓	✓	✓	✓
KW Win33 Driver			✓	✓	✓	-	✓	✓
Page			16-59	16-59	16-59	16-60	16-61	16-62

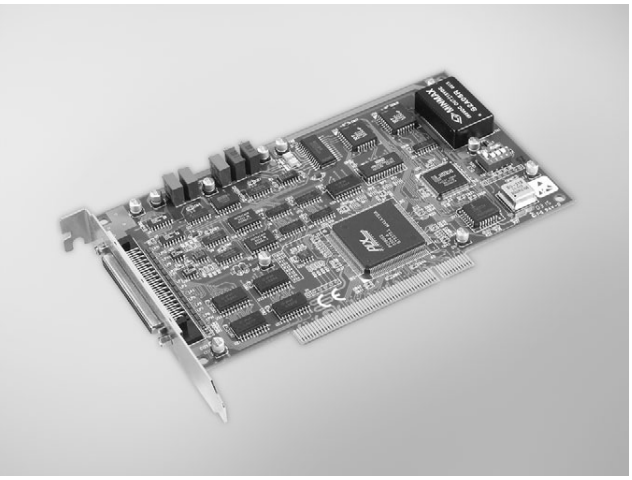
* Dry/wet contact can be mixed at the same time within one group.
** Jumper selectable Form A/Form B-type relay output

Isolated Digital I/O						Counter		
ISA		PC/104		PCI-104		PCI	ISA	PC/104
PCL-725	PCL-735	PCM-3725	PCM-3730	PCM-3730I	PCM-3761I	PCI-1780U	PCL-836	PCM-3780
-	-	8	16	-	-	8	16	24 (shared)
-	-	8	16	-	-	8	16	
-	-	-	0.5 V @ 8 mA	-	-	24 mA @ 0.5 V	8 mA @ 0.5 V	24 mA @ 0.5 V
-	-	-	0.4 mA @ 2.4 V	-	-	15 mA @ 2.4 V	0.4 mA @ 2.4 V	15 mA @ 2.0 V
8 (Sink)	-	8	8	16	8	-	-	-
1,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	-	-
5 ~ 24 V_{DC}	-	10 ~ 50 V_{DC}	5 ~ 24 V_{DC}	5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	-	-
4 x Form A 4 x Form C	12 x Form C	8 x Form C	8	16	8 x Form C	-	-	-
1,000 V_{DC}	1,000 V_{DC}	2,000 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,000 V_{DC}	-	-	-
0.5A @ 120 V_{AC} 1A @ 30 V_{DC}	1A @ 125 V_{AC} 2A @ 30 V_{DC}	0.25A @ 240 V_{DC} 1A @ 30 V_{DC}	5 ~ 40 V_{DC}	5 ~ 30 V_{DC}	0.25 A @ 240 V_{AC} 1 A @ 30 V_{DC}	-	-	-
			200 mA	350 mA		-	-	-
-	-	-	-	-	-	8 x CTR	6 x CTR 3 x PWM	2
-	-	-	-	-	-	16 bits	16 bits	16 bits
-	-	-	-	-	-	20 MHz	10 MHz	20 MHz
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	✓	✓	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	✓	-	-	-
-	-	-	-	-	-	-	-	-
147 x 95	155 x 100	96 x 90	96 x 90	96 x 90	96 x 90	175 x 100	185 x 100	96 x 90
1 x DB37	1 x DB37	1 x 20-pin 1 x 50-pin	3 x 20-pin	2 x 20-pin	1 x 20-pin 1 x 50-pin	68-pin SCSI	1 x DB37 2 x 20-pin	1 x 50-pin 1 x 20-pin
✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	✓	-	-
✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	✓	✓	✓	✓	-	-	✓
✓	-	-	✓	-	-	-	-	-
✓	✓	✓	✓	✓	✓	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-	-
16-63	16-64	16-70	16-70	16-71	16-71	16-65	16-66	16-70

PCI-1710U/UL
PCI-1710HGU

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card with High Gain



Features

- 16-ch single-ended or 8-ch differential or a combination of analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (4,096 samples)
- Two 12-bit analog output channels (PCI-1710U/HGU only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID™ switch

Introduction

The PCI-1710U series are multifunction cards for the PCI bus. Their advanced circuit design provides higher quality and more functions, including the five most desired measurement and control functions: 12-bit A/D conversion, D/A conversion, digital input, digital output, and counter/timer.

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **FIFO Size** 4,096 samples
- **Overvoltage Protection** 30Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range** (V, software programmable)

PCI-1710U/UL					
Gain	0.5	1	2	4	8
Bipolar	±10	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

PCI-1710HGU								
Gain	0.5	1	5	10	50	100	500	1000
Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
Unipolar	N/A	0 ~ 10	N/A	0 ~ 1	N/A	0 ~ 0.1	N/A	0 ~ 0.01
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4	0.4	0.8	0.8

- **Maximum Sampling Rate** (S/s, depending on PGIA setting time)

Model	Gain	Max. Sampling Rate
PCI-1710U/UL	0.5, 1, 2, 4, 8	100 kS/s
PCI-1710HGU	0.5, 1	100 kS/s
	5, 10	35 kS/s
	20, 100	7 kS/s
	500, 1000	770 S/s

Analog Output (PCI-1710U/HGU only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5 0 ~ 10
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 3 mA
- **Operation Mode** Software polling
- **Accuracy** INLE: ±1 LSB, DNLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 8.0 mA @ 0.8 V
Source: -0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz

Specifications Continued

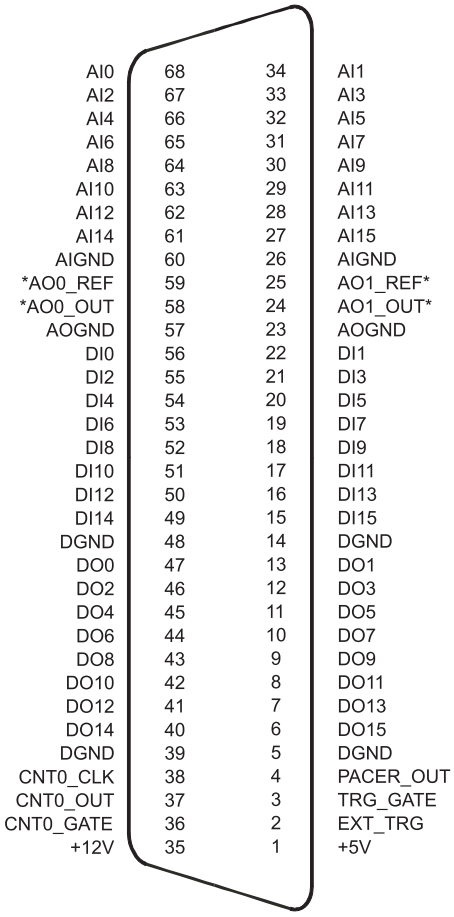
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1710U** 100 kS/s, 12-bit Multifunction Card
- **PCI-1710UL** 100 kS/s, 12-bit Multifunction Card w/o AO
- **PCI-1710HGU** 100 kS/s, 12-bit High-gain Multifunction Card
- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

Pin Assignments

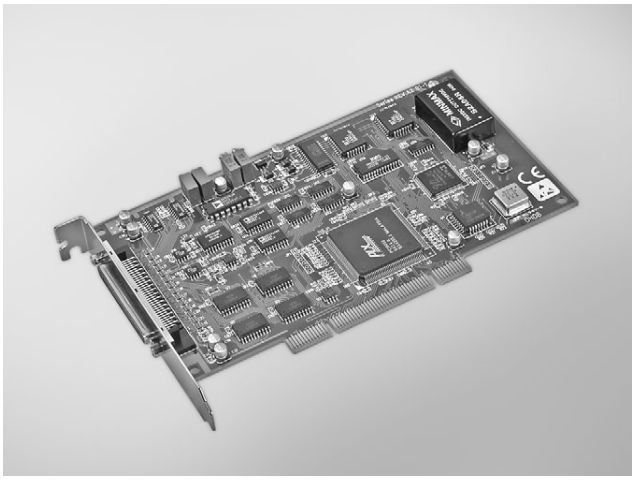


AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
*AO0_REF	59	25	AO1_REF*
*AO0_OUT	58	24	AO1_OUT*
AOGND	57	23	AOGND
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

*: Pins 23~25 and pins 57~59 are not defined for PCI-1710UL

PCI-1711U/UL

Entry-level 100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card



Features

- 16-ch single-ended analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (1,024 samples)
- Two 12-bit analog output channels (PCI-1711U only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter

Introduction

PCI-1711U and PCI-1711UL are powerful, but low-cost multifunction cards for the PCI bus. PCI-1711U comes with 2 analog output channels, while the PCI-1711UL doesn't. Thus, PCI-1711UL represents a cost saver for those that do not need analog output.

Specifications

Analog Input

- **Channels** 16 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 2 MΩ/5 pF
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Input Range** (V, software programmable)

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

Analog Output (PCI-1711U only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	Unipolar	0 ~ 5, 0 ~ 10
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 11 V/μs
- **Driving Capability** 3 mA
- **Output Impedance** 0.81 W
- **Operation Mode** Software polling
- **Accuracy** INLE: ±1 LSB
  DNLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: -0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz

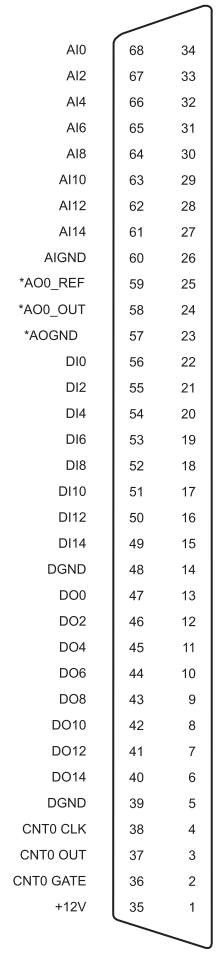
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
  PCI-1711U Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
  PCI-1711UL Typical: 5 V @ 700 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1711U** Entry-level 100 kS/s, 12-bit Multifunction Card
- **PCI-1711UL** Entry-level 100 kS/s, 12-bit Multi. Card w/o AO
- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

Pin Assignments

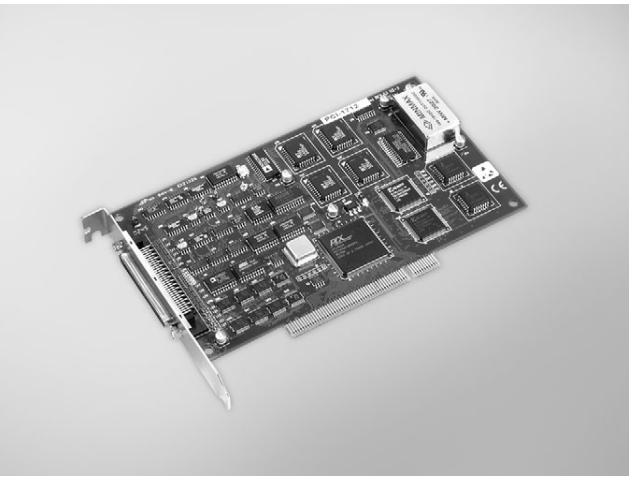


AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
*AO0_REF	59	25	AOI_REF*
*AO0_OUT	58	24	AOI_OUT*
*AOGND	57	23	AOGND*
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0 CLK	38	4	PACER OUT
CNT0 OUT	37	3	TRG GATE
CNT0 GATE	36	2	EXT TRG
+12V	35	1	+5V

*: Pins 23~25 and pins 57~59 are not defined for PCI-1711UL

PCI-1712/L

1 MS/s, 12-bit, 16-ch PCI Multifunction Card



Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 1 MHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (AI: 1,024 samples AO: 32,768 samples)
- Two 12-bit analog output channels with continuous waveform output function (PCI-1712 only)
- 16-ch digital input and 16-ch digital output
- Three 16-bit programmable multifunction counter/timers on 10 MHz
- Auto-calibration (AI/AO)
- PCI-Bus mastering data transfer
- Pre-, post-, about- and delay-trigger data acquisition modes for analog input channels
- Flexible triggering and clocking capabilities

Introduction

PCI-1712 and PCI-1712L are powerful high-speed multifunction cards for the PCI bus. They feature a 1 MHz 12-bit A/D converter, an onboard FIFO buffer (storing up to 1024 samples for A/D, and up to 32,768 samples for D/A conversion). The PCI-1712 cards provide a total of up to 16 single-ended or 8 differential A/D input channels or a mixed combination, two 12-bit D/A output channels, 16 digital input/output channels, and three 10 MHz 16-bit multifunction counter channels. PCI-1712L is a low-cost version without analog output.

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** Multi-channel, single gain: 1 MS/s
  Multi-channel, multi gain: 600 kS/s
  Multi-channel, multi gain, unipolar/bipolar: 400 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MW/10 pF (Off), 100 MW/100 pF (On)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Trigger Modes** Pre-trigger, post-trigger, delay-trigger and about-trigger
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

Analog Output (PCI-1712 only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** 1 MS/s
- **FIFO Size** 32,768 samples
- **Output Range** (V, software programmable)

Internal Reference	**Bipolar**	±5, ±10
	Unipolar	0 ~ 5, 0 ~ 10
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 W max.
- **Operation Mode** Software polling, continuous output and waveform output
- **Accuracy** INLE: ±1 LSB
  DNLE: ±1 LSB (monotonic)

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: -0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz, 1 MHz, 100 kHz, 10 kHz
  External Frequency: 10 MHz max.

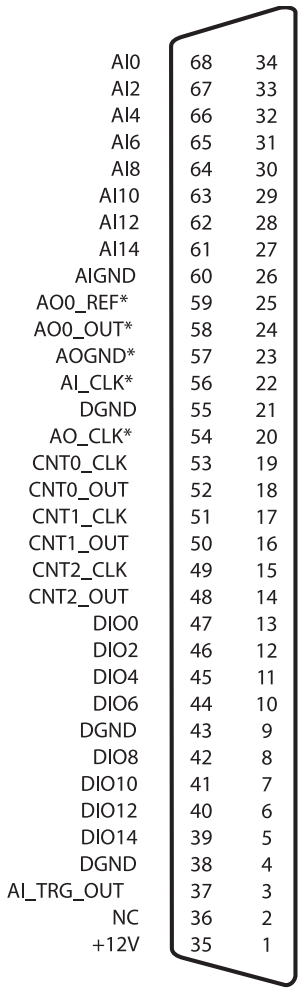
General

- **Bus Type** PCI V 2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1.0 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1712** 1 MS/s, 12-bit High-speed Multifunction PCI Card
- **PCI-1712L** 1 MS/s, 12-bit High-speed Multi. PCI Card w/o AO
- **PCLD-8712** DIN-rail Wiring Board for PCI-1712/L
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

Pin Assignments

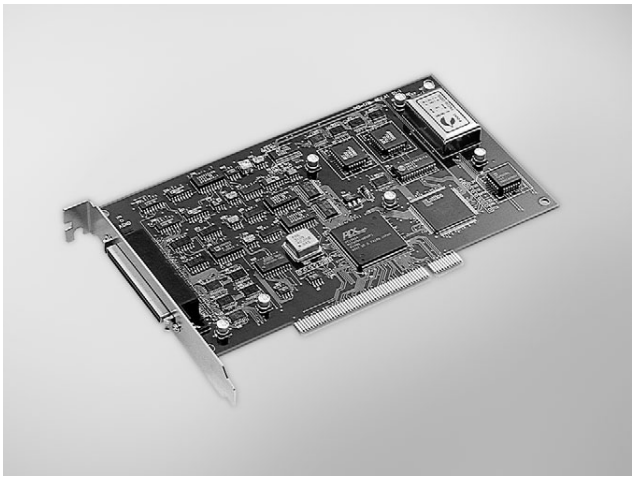


AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	ANA_TRG
AO0_REF*	59	25	AO1_REF*
AO0_OUT*	58	24	AO1_OUT*
AOGND*	57	23	AOGND*
AI_CLK*	56	22	AI_TRG*
DGND	55	21	DGND
AO_CLK*	54	20	AO_TRG*
CNT0_CLK	53	19	CNT0_GA TE
CNT0_OUT	52	18	DGND
CNT1_CLK	51	17	CNT1_GA TE
CNT1_OUT	50	16	DGND
CNT2_CLK	49	15	CNT2_GA TE
CNT2_OUT	48	14	DGND
DIO0	47	13	DIO1
DIO2	46	12	DIO3
DIO4	45	11	DIO5
DIO6	44	10	DIO7
DGND	43	9	DGND
DIO8	42	8	DIO9
DIO10	41	7	DIO1 1
DIO12	40	6	DIO13
DIO14	39	5	DIO15
DGND	38	4	DGND
AI_TRG_OUT	37	3	AI_CLK_OUT
NC	36	2	NC
+12V	35	1	+5V

*: Pin 20, 22~25, 54, 56~59 are not defined on PCI-1712L

PCI-1716/L

250 kS/s, 16-bit, 16-ch PCI Multifunction Card



Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Onboard FIFO memory (1,024 samples)
- Auto-calibration
- PCI-Bus mastering data transfer
- 2 analog output channels (PCI-1716 only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID™ switch

Introduction

PCI-1716 and PCI-1716L are powerful high-resolution multifunction cards for the PCI bus. They feature a 250 kS/s 16-bit A/D converter, and an onboard 1,024-sample FIFO buffer for A/D. The cards have up to 16 single-ended or 8 differential A/D input channels or a combination of these; two 16-bit D/A output channels, 16 digital input/output channels, and one 10 MHz 16-bit counter channel. PCI-1716 and PCI-1716L provide specific functions for different user requirements.

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (off), 100 MΩ/100 pF (on)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.05	0.03	0.03	0.05	0.1

Analog Output (PCI-1716 only)

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5 , 0 ~ 10
	Bipolar	±5, ±10
External Reference	0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)	

- **Slew Rate** 20 V/μs
- **Driving Capability** 20 mA
- **Output Impedance** 0.1 W max.
- **Operation Mode** Software polling
- **Accuracy** INLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.8 mA @ 0.8 V
Source: -2.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Reference Clock** Internal: 10 MHz
External Clock Frequency: 10 MHz max.

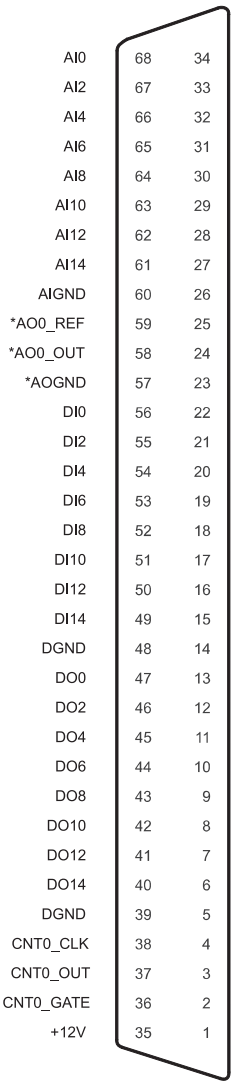
General

- **Bus Type** PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Operating Humidity** 5 ~ 85% RH non-condensing(refer to IEC 68-1, -2, -3)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-1, -2, -3)

Ordering Information

- **PCI-1716** 250 kS/s, 16-bit High-resolution Multi. Card
- **PCI-1716L** 250 kS/s, 16-bit High-res. Multi. Card w/o AO
- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

Pin Assignments

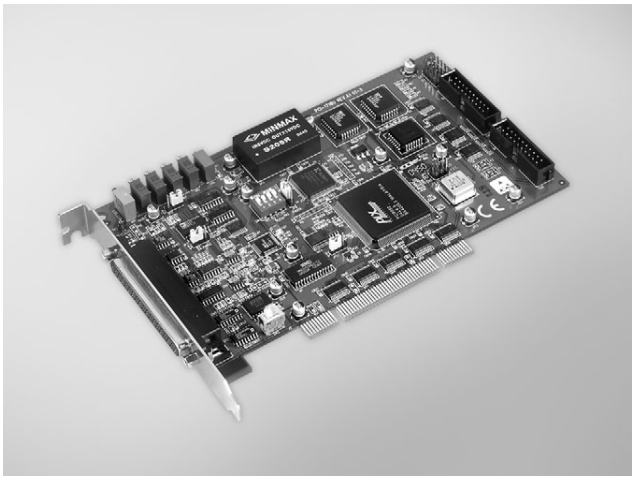


AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
*AO0_REF	59	25	AO1_REF*
*AO0_OUT	58	24	AO1_OUT*
*AOGND	57	23	AOGND*
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

*: Pins 23~25 and pins 57~59 are not defined for the PCI-1716L

PCI-1718HDU

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction Card



Features

- ISA-Compatible with PCL-818HD
- 16-ch single-ended or 8-ch differential analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (1,024 samples)
- One 12-bit analog output channel
- 16-ch digital input and 16-ch digital output
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

Introduction

The PCI-1718HDU and the PCL-818H series are 100 kS/s multifunction data acquisition cards that offer the five most desired measurement and control functions: 12-bit A/D conversion, 12-bit D/A conversion, digital input, digital output, and counter/timer. With 3-way compatibility, migration is possible from ISA bus to PCI bus.

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ
- **Sampling Modes** Software, onboard or external programmable pacer
- **Input Range**

PCI-1718HDU	Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
	Bipolar	±10	±5	±2.5	±1.25	±0.625
	Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

Analog Output

- **Channels** 1
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	Unipolar	0 ~ 5, 0 ~ 10
External Reference		0 ~ x V @ x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 W max.
- **Operation Mode** Software polling
- **Accuracy** INLE: ±1LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max., Logic 1: 2 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: -0.4 mA @ 2.0 V

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz

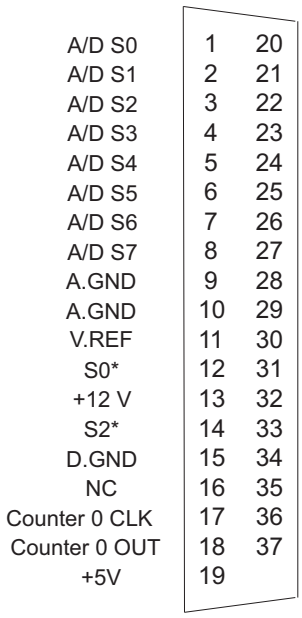
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x DB37 female connector
  2 x 20-pin box header
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1 A
- **Operating Temperature** 0 ~ 60 °C (32 ~ 140 °F)
- **Storage Temperature** -20 ~ 70 °C (-4 ~ 158 °F)
- **Operating Humidity** 5 ~ 85% RH non-condensing (refer to IEC 68-1, -2, -3)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-1, -2, -3)
- **Certifications** CE

Ordering Information

- **PCI-1718HDU** 100 kS/s, 12-bit, 16-ch Univ. PCI Multi. Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **PCLD-8115** Wiring Board w/ CJC Circuit & One DB37 Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments


A/D S0 1 20 A/D S8
A/D S1 2 21 A/D S9
A/D S2 3 22 A/D S10
A/D S3 4 23 A/D S11
A/D S4 5 24 A/D S12
A/D S5 6 25 A/D S13
A/D S6 7 26 A/D S14
A/D S7 8 27 A/D S15
A.GND 9 28 A.GND
A.GND 10 29 A.GND
V.REF 11 30 DA0.OUT
S0* 12 31 DA0.VREF
+12 V 13 32 S1*
S2* 14 33 S3*
D.GND 15 34 D.GND
NC 16 35 EXT.TRIG
Counter 0 CLK 17 36 Counter 0 GATE
Counter 0 OUT 18 37 PACER
+5V 19

CN1

D/O 0	1	2	D/O 1
D/O 2	3	4	D/O 3
D/O 4	5	6	D/O 5
D/O 6	7	8	D/O 7
D/O 8	9	10	D/O 9
D/O 10	11	12	D/O 11
D/O 12	13	14	D/O 13
D/O 14	15	16	D/O 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

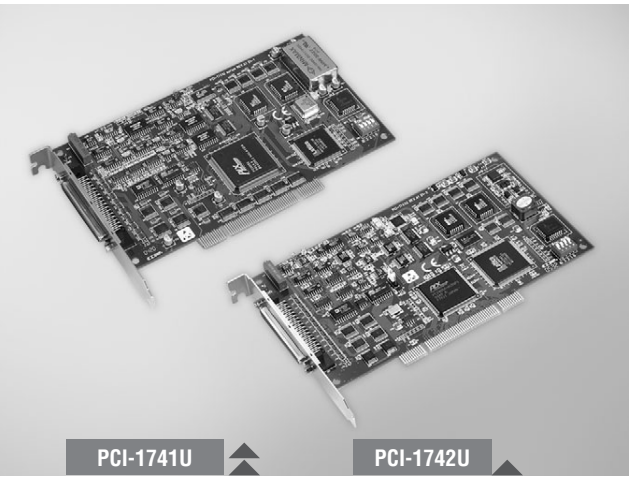
CN2

D/I 0	1	2	D/I 1
D/I 2	3	4	D/I 3
D/I 4	5	6	D/I 5
D/I 6	7	8	D/I 7
D/I 8	9	10	D/I 9
D/I 10	11	12	D/I 11
D/I 12	13	14	D/I 13
D/I 14	15	16	D/I 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

PCI-1741U
PCI-1742U

200 kS/s, 16-bit, 16-ch Universal PCI Multifunction Card

1 MS/s, 16-bit, 16-ch Universal PCI Multifunction Card



Features

- 16-ch single-ended or 8-ch differential analog input
- PCI-1741U: 16-bit A/D converter, with up to 200 kHz sampling rate
  PCI-1742U: 16-bit A/D converter, with up to 1 MHz sampling rate
- Onboard FIFO memory (1,024 samples)
- Auto calibration
- PCI-1741U: 1 x 16-bit analog output channel
  PCI-1742U: 2 x 16-bit analog output channels
- 16-ch digital input and 16-ch digital output
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- Onboard programmable counter
- BoardID™ switch

Introduction

PCI-1741U and PCI-1742U are powerful high-resolution multifunction data acquisition cards supporting universal PCI bus. The sampling rate is up to 1 MS/s (PCI-1742U) or 200 kS/s (PCI-1741U). Coupled with the 16-bit A/D converter, they are suitable for most data acquisition applications. PCI-1741U and PCI-1742U provides 16 single-ended or 8 differential analog input channels and 16 digital input/output channels. PCI-1741U provides one 16-bit D/A output channel, while PCI-1742U provides two 16-bit D/A output channels.

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** PCI-1741U: 200 kS/s
  PCI-1742U: single-channel - 1 MS/s
  multi-channel - 800 kS/s
  unipolar bipolar mixed - 250 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 20 Vp-p
- **Input Impedance** 100 MΩ/10pF (Off); 100 MΩ/100pF (On)
- **Sampling Mode** Software, onboard programmable pacer and external
- **Input Range*** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.02	0.02	0.02	0.03	0.04

* **Note:** All channels should be set to the same range

Analog Output

- **Channels** PCI-1741U: 1
  PCI-1742U: 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Bipolar**	±5, ±10
	Unipolar	0 ~ 5, 0 ~ 10
External Reference		0 ~ +xV @ +xV (-10 ≤ x ≤ 10) -x ~ +xV @ +xV (-10 ≤ x ≤ 10)

- **Slew Rate** PCI-1741U: 20 V/us
  PCI-1742U: 40 V/us
- **Driving Capability** ±20 mA
- **Output Impedance** 0.1 W max.
- **Operation Mode** Software polling
- **Accuracy** INLE: ±2LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 24 mA @ 0.8 V
  Source: -15 mA @ 2.0 V

Counter/Timer

- **Channels** 1
- **Compatibility** 5 V/TTL
- **Resolution** 16 bits
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz

General

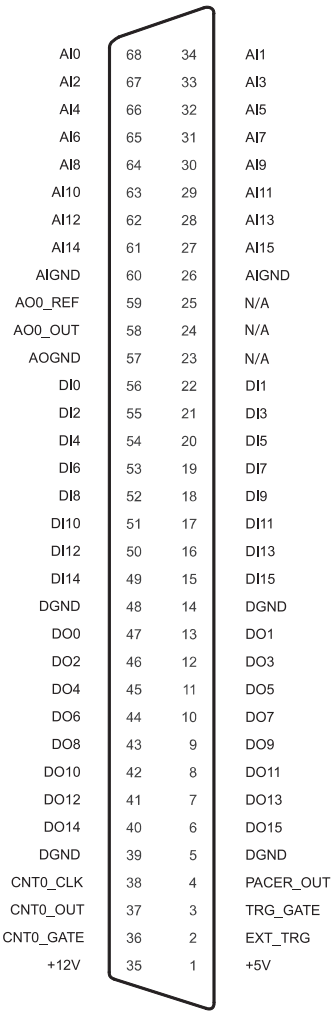
- **Bus Type** Universal PCI V2.2
- **I/O Connector Type** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

Ordering Information

- **PCI-1741U** 200 kS/s, 16-bit, 16-ch Univ. PCI Multi. Card
- **PCI-1742U** 1 MS/s, 16-bit, 16-ch Univ. PCI Multi. Card
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCLD-8710** DIN-rail Wiring Board w/ CJC

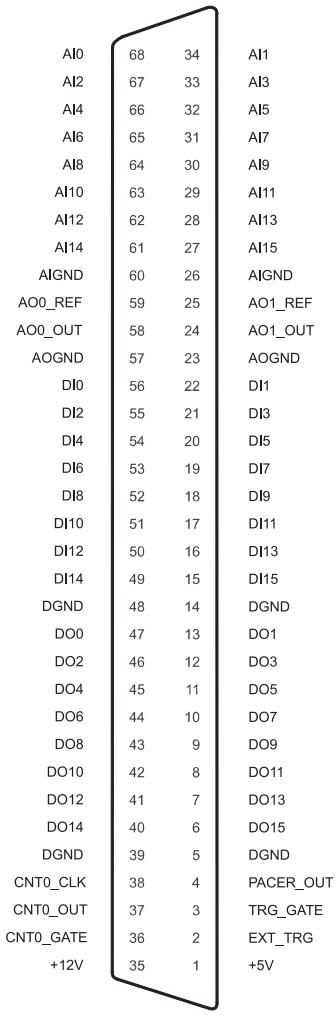
Pin Assignments

PCI-1741U



AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
AO0_REF	59	25	N/A
AO0_OUT	58	24	N/A
AOGND	57	23	N/A
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

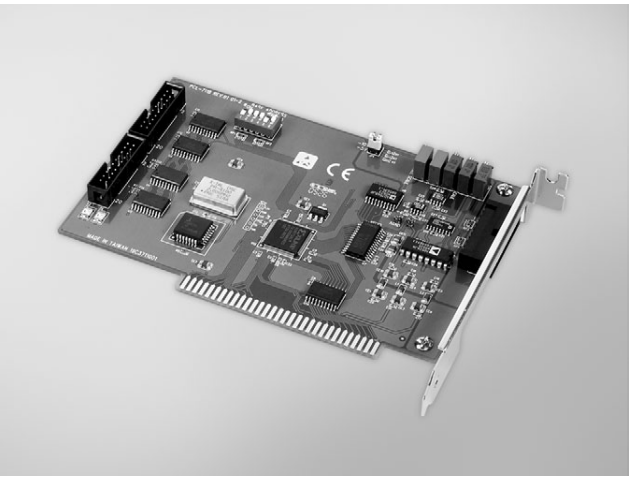
PCI-1742U



AI0	68	34	AI1
AI2	67	33	AI3
AI4	66	32	AI5
AI6	65	31	AI7
AI8	64	30	AI9
AI10	63	29	AI11
AI12	62	28	AI13
AI14	61	27	AI15
AIGND	60	26	AIGND
AO0_REF	59	25	AO1_REF
AO0_OUT	58	24	AO1_OUT
AOGND	57	23	AOGND
DI0	56	22	DI1
DI2	55	21	DI3
DI4	54	20	DI5
DI6	53	19	DI7
DI8	52	18	DI9
DI10	51	17	DI11
DI12	50	16	DI13
DI14	49	15	DI15
DGND	48	14	DGND
DO0	47	13	DO1
DO2	46	12	DO3
DO4	45	11	DO5
DO6	44	10	DO7
DO8	43	9	DO9
DO10	42	8	DO11
DO12	41	7	DO13
DO14	40	6	DO15
DGND	39	5	DGND
CNT0_CLK	38	4	PACER_OUT
CNT0_OUT	37	3	TRG_GATE
CNT0_GATE	36	2	EXT_TRG
+12V	35	1	+5V

PCL-711B

40 kS/s, 12-bit, 8-ch ISA Multifunction Card



Features

- 8-ch single-ended analog input
- 12-bit A/D converter, with up to 40 kHz sampling rate
- Programmable gain
- One 12-bit analog output channel
- 16-ch digital input and 16-ch digital output
- Screw-terminal board and cable included

Introduction

PCL-711B offers four of the most popular I/O functions for PC and compatible systems: A/D conversion, D/A conversion, digital input and digital output. The inexpensive PCL-711B is ideal for entry level applications. The features of this half-sized card include: eight 12-bit analog inputs, one 12-bit analog output, 16 digital inputs and 16 digital outputs. In addition, it comes with a 20-point screw-terminal board and a flat cable connector. PCL-711B performs a variety of I/O jobs, and features solid software support and a large selection of available daughterboards and accessories. It is an ideal and affordable performer for OEMs, schools and hobbyists who require a combination of analog and digital I/O.

Specifications

Analog Input

- **Channels** 8 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 40 kS/s
- **FIFO Size** 0
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** >10 MΩ
- **Sampling Modes** Software, pacer or external trigger
- **Input Range (V)** ±5, ±2.5, ±1.25, ±0.625, ±0.3125
- **Accuracy** ±2 LSB

Analog Output

- **Channels** 1 double-buffered
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** 0 ~ 5 V or 0 ~ 10 V
- **Driving Capability** 5 mA

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8V max.
Logic 1: 2.0V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 8 mA
Source: 0.4 mA

General

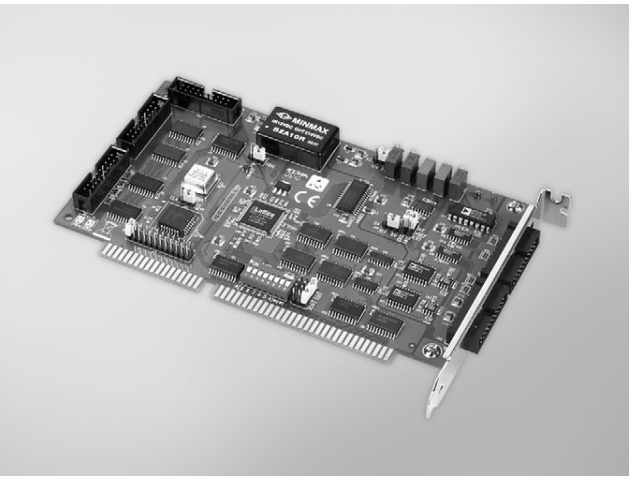
- **Bus Type** ISA
- **I/O Connectors** 3 x 20-pin box header
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Power Consumption** 5 V @ 500 mA typical, 1.0 A max.
12 V @ 50 mA typical, 100 mA max.
-12 V @ 14 mA typical, 20 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

Ordering Information

- **PCL-711B** 40 kS/s, 12-bit, 8-ch ISA Multifunction Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m

PCL-812PG

30 kS/s, 12-bit, 16-ch ISA Multifunction Card



Features

- 16-ch single-ended analog input
- 12-bit A/D converter, with up to 30 kHz sampling rate
- Programmable gain
- Two 12-bit analog output channels
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- A/D with DMA or interrupt

Introduction

PCL-812PG is a multifunction analog and digital I/O card that features the five most desired measurement and control functions for PC/AT and compatible systems: A/D conversion, D/A conversion, digital input, digital output and counter/timer. This half-size card neatly packages 16 12-bit analog input channels, two 12-bit analog output channels, 16 digital input channels, 16 digital output channels and a programmable counter/timer.

In addition to all the features listed above, PCL-812PG offers the convenience of programmable analog input ranges, where the analog input range can be switched by software commands instead of DIP switches. PCL-812PG also delivers convenience and maximum resolution for applications that need different gains for different channels or different gains for different stages of a process. Comprehensive software support, numerous I/O options and a wide range of available daughterboards make the PCL-812PG ideal for industrial applications that require a combination of analog and digital I/O.

Specifications

Analog Input

- **Channels** 16 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 30 kS/s
- **FIFO Size** 0
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** >10 MΩ
- **Sampling Modes** Software, pacer or external trigger
- **Input Range** (V, software programmable)
  ±10, ±5, ±2.5, ±1.25, ±0.625, ±0.3125
- **Accuracy** 0.4% of reading ±1 LSB

Analog Output

- **Channels** 2 double-buffered
- **Resolution** 12 bits
- **Output Rate** Software polling
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5, 0 ~ 10
External Reference		±10 max.

- **Driving Capability** 5 mA

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max., Logic 1: 2.4 V min.
- **Output Capacity** Sink: 8.0 mA, Source: 0.4 mA

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 kHz
- **Reference Clock** Internal: 2 MHz
  External Frequency: 10 MHz
  External Voltage Range: 5V/TTL

General

- **Bus Type** ISA
- **I/O Connectors** 5 x 20-pin box header
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** 5 V @ 500 mA typical, 1.0 A max.
  12 V @ 50 mA typical, 100 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

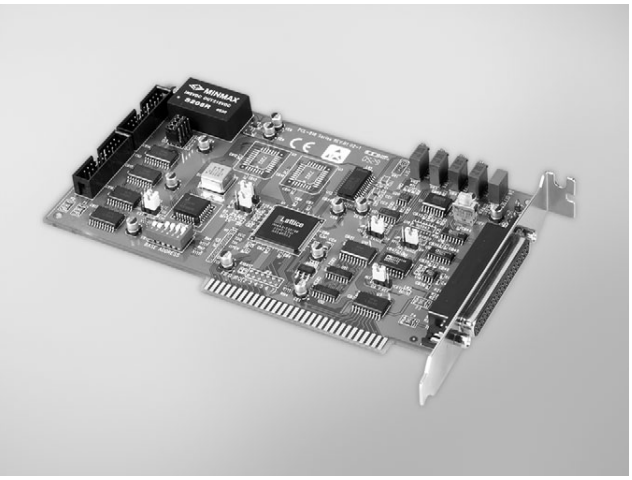
Ordering Information

- **PCL-812PG** 30 kS/s, 12-bit, 16-ch ISA Multifunction Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables

PCL-818HD/HG
PCL-818L

100 kS/s, 12-bit, 16-ch ISA Multifunction Card

40 kS/s, 12-bit, 16-ch ISA Multifunction Card



Features

- 16-ch single-ended or 8-ch differential analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (1,024 samples, PCL-818HD/HG only)
- One 12-bit analog output channel
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter

Introduction

The PCL-818L series was designed for entry-level models to the PCL-818 series. The cards have been designed with the cost-sensitive customer in mind, but still offers the same functions as the rest of the series, except that they have a 40 kHz sampling rate and only accepts bipolar inputs. They are fully software and connector compatible with the PCL-818HD and PCL-818HG. This lets you upgrade your applications to these higher performance cards without hardware or software changes.

The PCL-818LS bundle consists of the PCL-818L card, the PCLD-8115 wiring terminal board and a DB37 cable assembly. The PCLD-8115 accommodates onboard passive signal conditioning components (resistors and capacitors), allowing you to easily implement a low-pass filter, a voltage attenuator or a 4 ~ 20 mA voltage converter.

Specifications

Analog Input

- **Channels** 16 single-ended / 8 differential
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s for all input ranges (PCL-818HD/HG only)
  40 kS/s for all input ranges (PCL-818L only)
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 10 MΩ
- **Sampling Modes** Software, pacer or external
- **Input Range** (V, software programmable)

PCL-818L/818HD					
Bipolar	±10	±5	±2.5	±1.25	±0.625
Unipolar*	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

* **Note:** PCL-818L doesn't support unipolar input range.

PCL-818HG								
Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
Unipolar	N/A	0 ~ 10	N/A	0 ~ 1	N/A	0 ~ 0.1	N/A	0 ~ 0.01
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4	0.4	0.8	0.8

Analog Output

- **Channels** 1
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5, 0 ~ 10
External Reference		0 ~ 10, 0 ~ -10

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 8 mA
  Source: -0.4 mA

Timer/Counter

- **Channels** 1
- **A/D Pacer** 32-bit with 10 MHz or 1 MHz time base
- **Max. and Min. Rates** 2.5 MHz and 0.00023 Hz
- **Counter** One 16-bit counter with 100 kHz time base

General

- **Power Consumption** 5 V @ 210 mA typical, 500 mA max.
  12 V @ 20 mA typical, 100 mA max.
  -12 V @ 20 mA typical, 40 mA max.
- **I/O Connector** 1 x DB37 female connector
  2 x 20-pin box header
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-818HD** High-performance Half-size Multifunction Card
- **PCL-818HG** High-performance and High-gain Multi. Card
- **PCL-818L** Low-cost High-perform. Half-size Multi. Card
- **PCL-818LS** PCL-818L w/ PCLD-8115 and DB37 Cable
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **PCLD-8115** Wiring Board w/ CJC Circuit & One DB37 Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments

CN1

D/O 0	1	2	D/O 1
D/O 2	3	4	D/O 3
D/O 4	5	6	D/O 5
D/O 6	7	8	D/O 7
D/O 8	9	10	D/O 9
D/O 10	11	12	D/O 11
D/O 12	13	14	D/O 13
D/O 14	15	16	D/O 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

CN2

D/I 0	1	2	D/I 1
D/I 2	3	4	D/I 3
D/I 4	5	6	D/I 5
D/I 6	7	8	D/I 7
D/I 8	9	10	D/I 9
D/I 10	11	12	D/I 11
D/I 12	13	14	D/I 13
D/I 14	15	16	D/I 15
D.GND	17	18	D.GND
+5 V	19	20	+12 V

CN3 (Single ended)

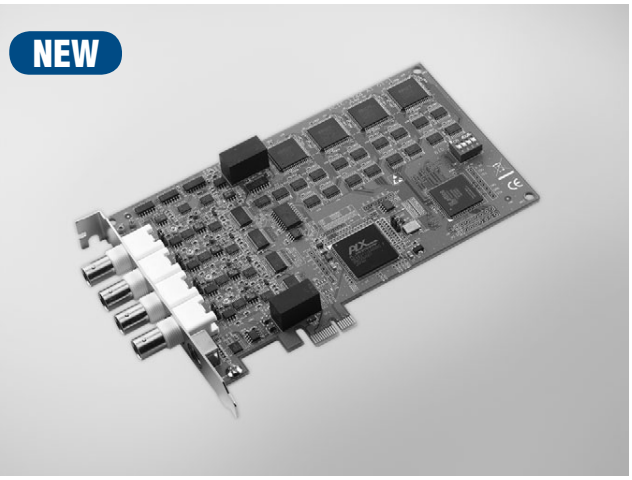
A/D S0	1	20	A/D S8
A/D S1	2	21	A/D S9
A/D S2	3	22	A/D S10
A/D S3	4	23	A/D S11
A/D S4	5	24	A/D S12
A/D S5	6	25	A/D S13
A/D S6	7	26	A/D S14
A/D S7	8	27	A/D S15
A.GND	9	28	A.GND
A.GND	10	29	A.GND
VREF	11	30	DA0.OUT
S0*	12	31	DA0.VREF
+12 V	13	32	S1*
S2*	14	33	S3*
D.GND	15	34	D.GND
NC	16	35	EXT.TRIG
Counter	17	36	Counter 0
Counter	18	37	PACER
+5 V	19		

CN3 (Differential)

A/D H0	1	20	A/D L0
A/D H1	2	21	A/D L1
A/D H2	3	22	A/D L2
A/D H3	4	23	A/D L3
A/D H4	5	24	A/D L4
A/D H5	6	25	A/D L5
A/D H6	7	26	A/D L6
A/D H7	8	27	A/D L7
A.GND	9	28	A.GND
A.GND	10	29	A.GND
VREF	11	30	DA0.OUT
S0*	12	31	DA0.VREF
+12 V	13	32	S1*
S2*	14	33	S3*
D.GND	15	34	D.GND
NC	16	35	EXT.TRIG
Counter	17	36	Counter 0
Counter	18	37	PACER
+5 V	19		

PCIE-1744

30 MS/s, 12-bit, Simultaneous 4-ch Analog Input PCI Express Card



Features

- 4 single-ended analog input channels
- 12-bit A/D converter, with up to 30 MHz sampling rate
- Programmable gain
- Onboard FIFO memory (32,768 samples, each channel)
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/counter
- BoardID™ switch
- PCI Express V1.0

Introduction

PCIE-1744 is an advanced high-performance data acquisition card based on the PCI Express bus. With a large FIFO of 32k for each channel, the maximum sampling rate can get up to 30 MS/s, on each channel, with an emphasis on continuous, non-stop, high-speed, streaming data of samples to host memory.

Specifications

Analog Input

- **Channels** 4 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 30 MS/s
- **FIFO Size** 32,768 samples for each channel
- **Overvoltage Protection** 14 Vp-p
- **Input Impedance** 50 Ω/1 MΩ/Hi Z jumper selectable/100 pF
- **Sampling Modes** Software polling, pacer
- **Trigger Modes** Post-trigger, pre-trigger, delay-trigger, about-trigger
- **Input Range (V)** ±5, ±2.5, ±1, ±0.5

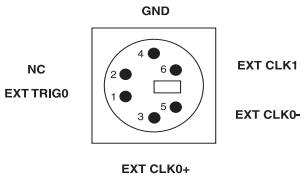
General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 4 x BNC connector (for AI)
  1 x PS/2 connector (for Ext. clock and trigger)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA ; 12 V @ 600 mA
  Max.: 5 V @ 1 A; 12 V @ 700m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

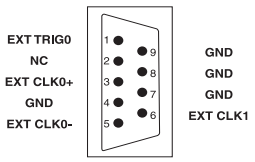
Ordering Information

- **PCIE-1744** 30 MS/s, 12-bit, Simultaneous 4-ch AI PCIe Card
- **ADAM-3909** DB9 DIN-rail Wiring Board
- **PCL-1010B-1** BNC to BNC Wiring Cable, 1 m
- **PCL-10901-1** PS/2 to DB9 Cable, 1 m
- **PCL-10901-3** PS/2 to DB9 Cable, 3 m

Pin Assignments



Onboard PS/2 Connector

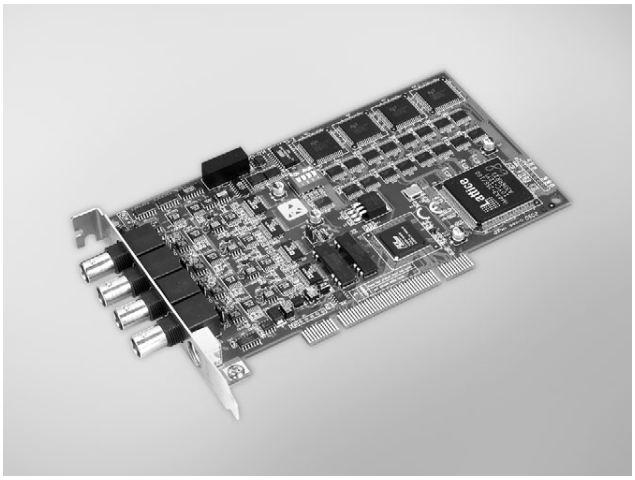


PS/2 To DB9 Cable Connector

PCI-1714U
PCI-1714UL

30 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card

10 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card



Features

- 4 single-ended analog input channels
- 12-bit A/D converter, with up to 30 MHz sampling rate
- Programmable gain
- Onboard FIFO memory
  (PCI-1714U: 32,768 samples; PCI-1714UL: 8,192 samples, each channel)
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/counter
- BoardID™ switch
- Universal PCI Bus (support 3.3 V or 5 V PCI bus signal)

Introduction

PCI-1714U is an advanced high-performance data acquisition card based on the PCI bus. With a large FIFO of 32,768 for each channel, the maximum sampling rate of PCI-1714U can get up to 30 MS/s, on each channel, with an emphasis on continuous, non-stop, high-speed, streaming data of samples to host memory. The low-cost PCI-1714UL offers 10 MS/s on each channel at a stable rate, and has also been equipped with a universal PCI interface.

Specifications

Analog Input

- **Channels** 4 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** PCI-1741U: 30 MS/s
  PCI-1741UL: 10 MS/s
- **FIFO Size** PCI-1714U: 32,768 samples for each channel
  PCI-1714UL: 8,192 samples for each channel
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 50 Ω/1 MΩ/Hi Z jumper selectable/100 pF
- **Sampling Modes** Software polling, pacer
- **Trigger Modes** Post-trigger, pre-trigger, delay-trigger, about-trigger
- **Input Range (V)** ±5, ±2.5, ±1, ±0.5

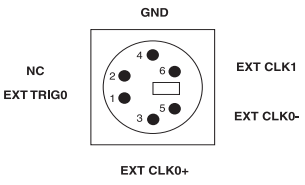
General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 4 x BNC connector (for AI)
  1 x PS/2 connector (for Ext. clock and trigger)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA ; 12 V @ 600 mA
  Max.: 5 V @ 1 A; 12 V @ 700m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

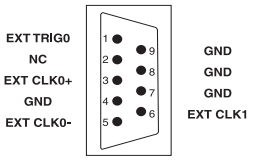
Ordering Information

- **PCI-1714U** 30 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card
- **PCI-1714UL** 10 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card
- **ADAM-3909** DB9 DIN-rail Wiring Board
- **PCL-1010B-1** BNC to BNC Wiring Cable, 1 m
- **PCL-10901-1** PS/2 to DB9 Cable, 1 m
- **PCL-10901-3** PS/2 to DB9 Cable, 3 m

Pin Assignments



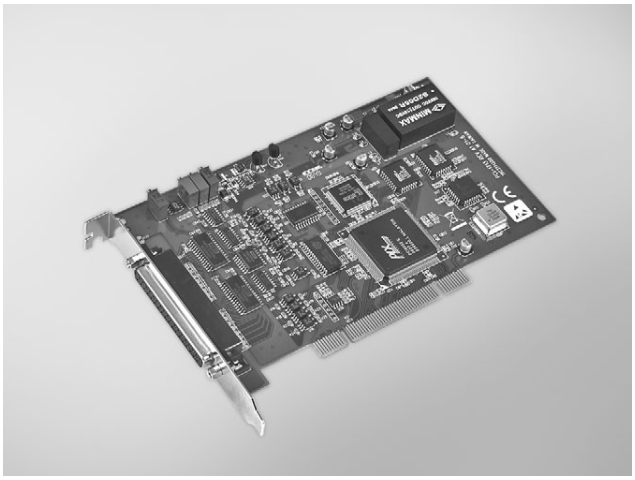
Onboard PS/2 Connector



PS/2 To DB9 Cable Connector

PCI-1713U

100 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card



Features

- 2,500 V_{DC} isolation protection
- 32-ch single-ended or 16-ch differential or a combination of analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Onboard FIFO memory (4,096 samples)
- S/W, internal or external pacer sampling modes supported

Introduction

The PCI-1713U is an isolated high-speed analog input card for the PCI bus. It provides 32 analog input channels with a sampling rate up to 100 kS/s, 12-bit resolution and isolation protection of 2,500 V_{DC}.

Specifications

Analog Input

- **Channels** 32 single-ended/16 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s
- **FIFO Size** 4,096 samples
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 2,500 V_{DC}
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external (TTL level)
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

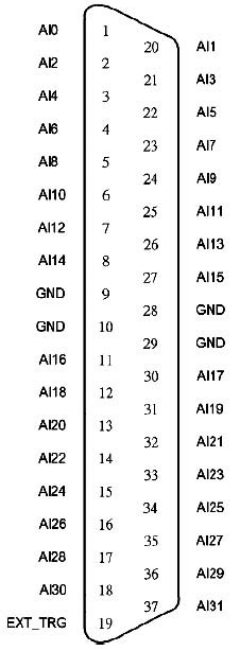
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

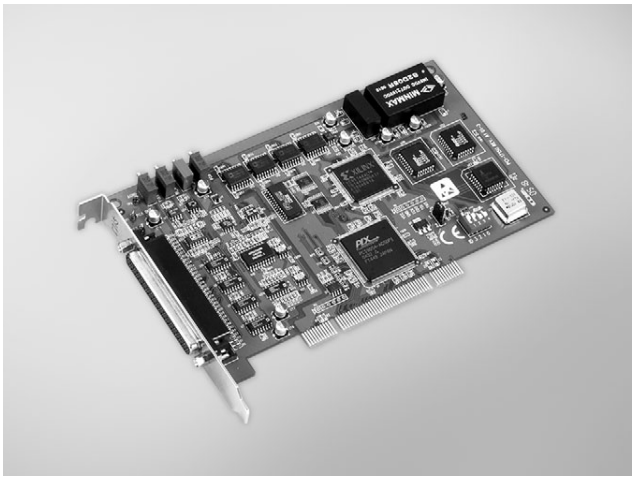
- **PCI-1713U** 100 kS/s, 12-bit, 32-ch Isolated AI PCI Card
- **PCLD-881B** Wiring Board for PCI-1713U, PCI-1715U & PCL-813B
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m

Pin Assignments



PCI-1715U

500 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card



Features

- 2,500 V_{DC} isolation protection
- 32-ch single-ended or 16-ch differential or a combination of analog input
- 12-bit resolution for A/D conversion
- Up to 500 kS/s sampling rate for A/D conversion
- Programmable gain for each input channel
- Onboard 1,024 samples FIFO buffer
- S/W, internal or external pacer sampling modes supported
- Universal PCI Bus
- BoardID™ switch

Introduction

The PCI-1715U is an isolated high-speed analog input card for the PCI bus. It provides 32 analog input channels with a sampling rate up to 500 kS/s, 12-bit resolution and isolation protection of 2,500 V_{DC}.

Specifications

Analog Input

- **Channels** 32 single-ended/16 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** 500 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 2,500 V_{DC}
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external (TTL level)
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.1	0.2	0.2	0.4

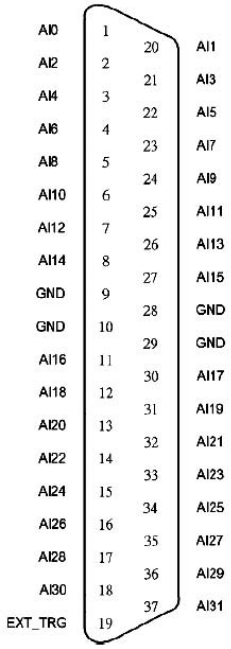
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

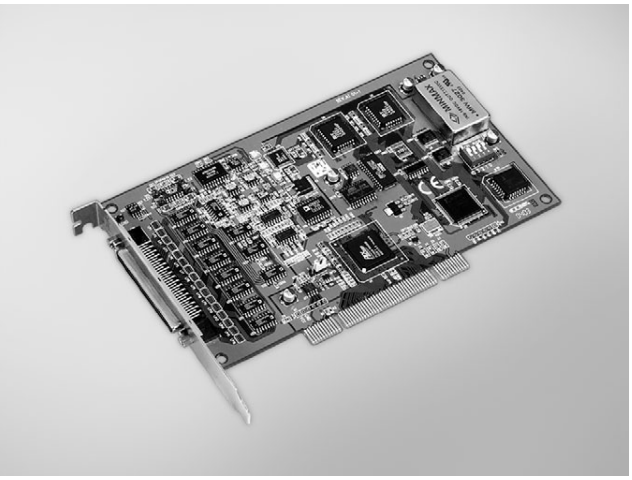
- **PCI-1715U** 500 kS/s, 12-bit, 32-ch Isolated AI PCI Card
- **PCLD-881B** Wiring Board for PCI-1713U, PCI-1715U & PCL-813B
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m

Pin Assignments



PCI-1747U

250 kS/s, 16-bit, 64-ch Analog Input Universal PCI Card



Features

- 64-ch single-ended or 32-ch differential or a combination of analog input
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Auto calibration
- Onboard FIFO memory (1,024 samples)
- PCI-Bus mastering data transfer
- Universal PCI Bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

Introduction

PCI-1747U is a high-resolution, high-channel-count analog input card for the PCI bus. Its sampling rate is up to 250 kS/s and 16-bit resolution provides the resolution needed for most data acquisition applications. PCI-1747U provides 64 single-ended, 32 differential analog input channels or a combination of these. It also has built in a 1,024 FIFO buffer for analog input data.

Specifications

Analog Input

- **Channels** 64 single-ended, 32 differential, or combination
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s
- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 20 Vp-p
- **Input Impedance** 100 MΩ/10 pF (Off); 100 MΩ/100 pF (On)
- **Sampling Modes** Software and onboard programmable pacer
- **Input Range** (V, software programmable)

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.03	0.02	0.02	0.03	0.04

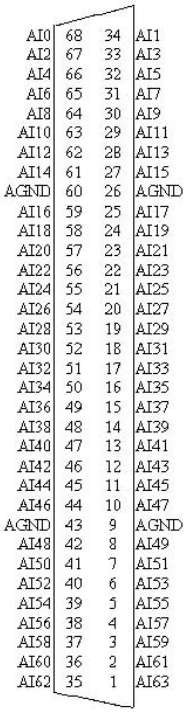
General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

Ordering Information

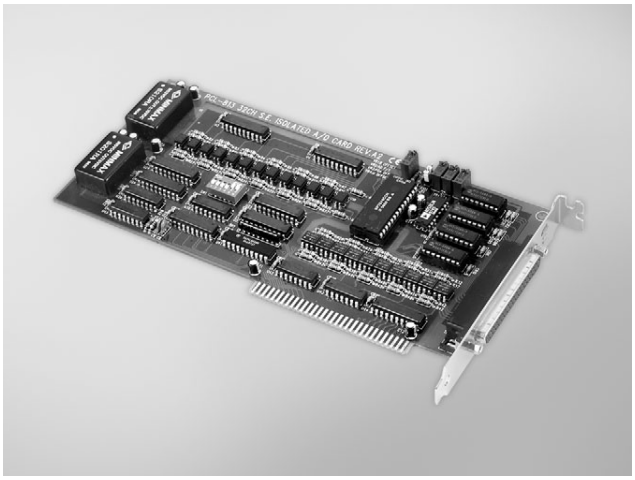
- **PCI-1747U** 250 kS/s, 16-bit, 64-ch AI Universal PCI Card
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m

Pin Assignments



PCL-813B

25 kS/s, 12-bit, 32-ch Isolated Analog Input ISA Card



Features

- 32 single-ended analog input channels
- 12-bit A/D converter, with up to 25 kHz sampling rate
- Isolation protection (500 V_{DC})
- Program-controlled A/D trigger and data transfer

Introduction

PCL-813B is a 12-bit 32-channel analog input card that offers high-voltage isolation on each analog input. It is an extremely cost effective solution for applications in industrial measurement and monitoring. The card offers 32 analog input channels with software programmable gain on each channel and two DC-to-DC converters on a 4-layer PCB with an integral ground plane. Optically-isolated inputs provide over 500 V_{DC} of isolation between the analog inputs and the PC, protecting the PC and peripherals from damage due to high voltages on the input lines. PCL-813B is ideal for situations where the budget-conscious user requires flexibility, stability and a high level of isolation protection. PCL-813B comes with the PCLD-881B wiring terminal board and a DB37 cable assembly.

Specifications

Analog Input

- **Channels** 32 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 25 kHz
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 500 V_{DC} from analog input to PC
- **Input Impedance** > 10 MΩ
- **Sampling Modes** software trigger
- **Input Range** (V, software programmable)

Unipolar (jumper selection)	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar (software selection)	±5	±2.5	±1.25	±0.625
Accuracy (% of FSR ±1LSB)	0.1	0.2	0.2	0.4

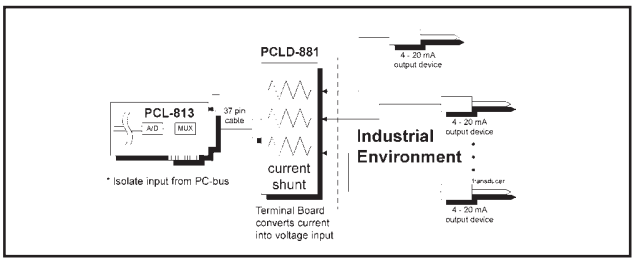
General

- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 219 x 100 mm (8.6" x 3.9")
- **Power Consumption** 5 V @ 660 mA max.
  12 V @ 140 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-813B** 25 kS/s, 12-bit, 32-ch Isolated AI ISA Card
- **PCLD-881B** Wiring Board for PCI-1713U, PCI-1715U & PCL-813B
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

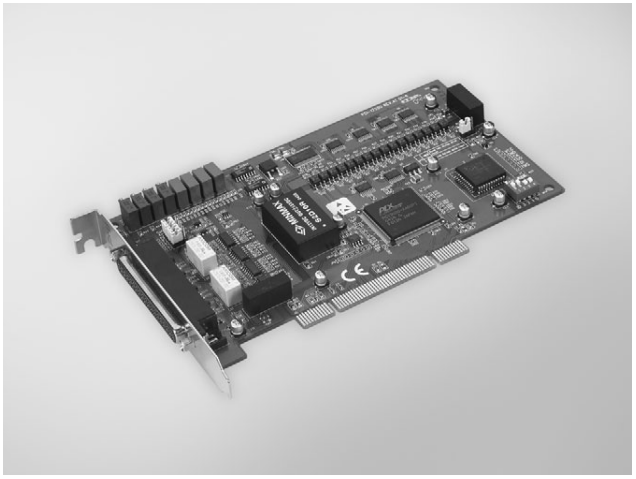
Typical application for PCL-813B:



Industrial 4 ~ 20 mA Output Device Monitoring

PCI-1720U

12-bit, 4-ch Isolated Analog Output Universal PCI Card



Features

- 4 x 12-bit D/A output channels
- Multiple output ranges
- 2,500 V_{DC} isolation between the outputs and the PCI bus
- Keeps the output settings and values after system reset
- One DB37 connector for easy wiring
- Universal PCI and BoardID™ switch

Introduction

The PCI-1720U provides four 12-bit isolated digital-to-analog outputs for the Universal PCI bus. With isolation protection of 2500 V_{DC} between the outputs and the PCI bus, the PCI-1720U is ideal for industrial applications where high-voltage protection is required.

Specifications

Analog Output

- **Channels** 4 isolated
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Unipolar (V)**	0 ~ 5, 0 ~ 10
	Bipolar (V)	±5, ±10
	Current Loop (mA)	0~ 20, 4 ~ 20

- **Slew Rate** 2 V/μs
- **Isolation Protection** 2,500 V_{DC}
- **Driving Capability** 5 mA
- **Operation Modes** Software polling
- **Accuracy** ±0.024%
- **Excitation Voltage** 50 V (max.)

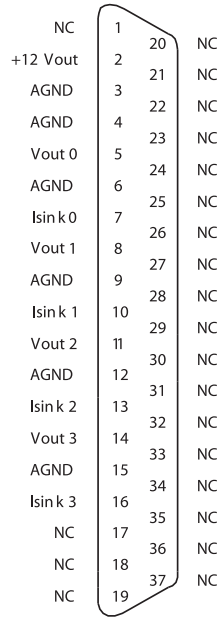
General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** 5 V @ 350 mA (typical), 500 mA (max.)
12 V @ 200 mA (typical), 350 mA (max.)
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** CE

Ordering Information

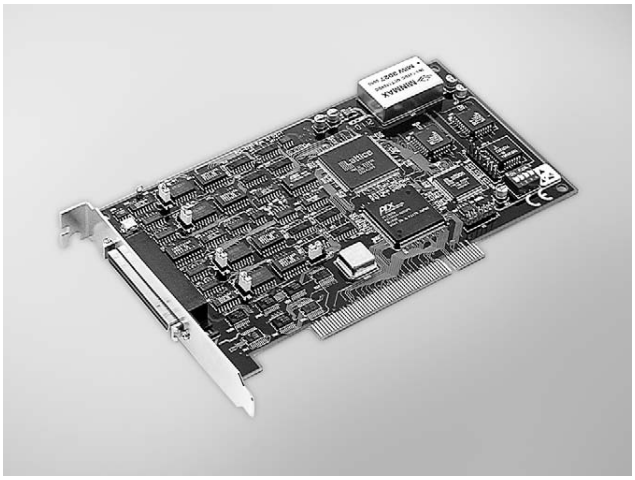
- **PCI-1720U** 12-bit, 4-ch Isolated AO Universal PCI Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments



PCI-1721

12-bit, 4-ch Analog Output PCI Card with 16-ch Digital I/O



Features

- 10 MHz maximum digital update rate
- PCI-bus mastering for data transfer
- Auto calibration function
- Four analog output channels with 1,024 samples FIFO buffer
- A 12-bit DAC is equipped for each of analog output channels
- Real-time waveform output function with internal/external pacer
- Synchronized output function
- Flexible output types and range settings
- Keeps the output settings and values after system hot reset
- 16-ch DI/O and one 10 MHz 16-bit resolution counter
- BoardID™ switch

Introduction

PCI-1721 is an advanced high-speed analog output card for the PCI bus, and each of analog output channels are equipped with a 12-bit, double-buffered DAC. It features many powerful and unique functions, like a waveform output function with 10 MHz maximum update rate, auto-calibration and a BoardID switch. PCI-1721 is an ideal solution for industrial applications where high-speed continuous analog output or real-time waveform output functions are required.

Specifications

Analog Output

- **Channels** 4
- **Resolution** 12 bits
- **FIFO Size** 1,024 samples
- **Output Rate** 10 MHz or static update
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max., 2 V min.
- **Output Range** (Software programmable)

Internal Reference	**Unipolar**	0 ~ 5 V, 0 ~ 10 V,
	Bipolar	±5 V, ±10 V
	Current Loop	0 ~ 20 mA, 4 ~ 20 mA
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Single/continuous/waveform/synchronized output
- **Accuracy** Relative: ±1 LSB
  Differential Non-linearity: ±1 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ -15 mA

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max, 2.0 V min.

General

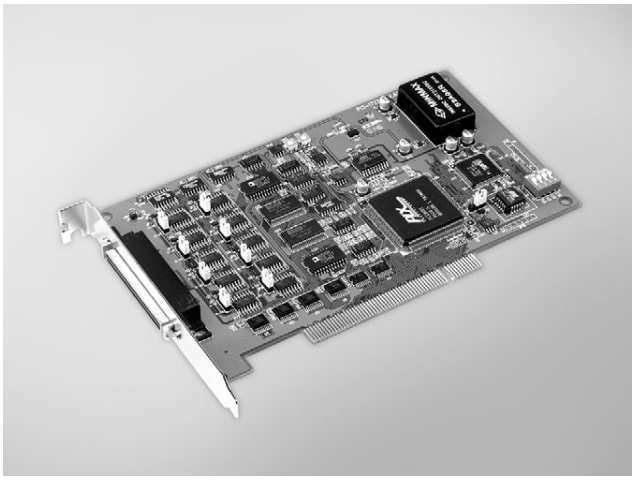
- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications** FCC, CE

Ordering Information

- **PCI-1721** 12-bit, 4-ch Advanced PCI Analog Output Card
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1723

16-bit, 8-ch Analog Output PCI Card with 16-ch Digital I/O



Features

- Auto calibration function
- A 16-bit DAC is equipped for each analog output channel
- Synchronized output function
- Keeps the output settings and values after system hot reset
- 2-port (16-channel) user-defined digital input/output channels
- BoardID™ switch

Introduction

PCI-1723 is a non-isolated multiple channel analog output card for the PCI bus, and each analog output channel is equipped with a 16-bit, double-buffered DAC. It also features an auto-calibration function and a BoardID™ switch. The PCI-1723 is an ideal solution for industrial applications where multiple analog output channels are required.

Specifications

Analog Output

- **Channels** 8
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Bipolar (V)**	±10
	Current Loop (mA)	0 ~ 20, 4 ~ 20

- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±6 LSB
  Differential Non-linearity: ±6 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ -15 mA

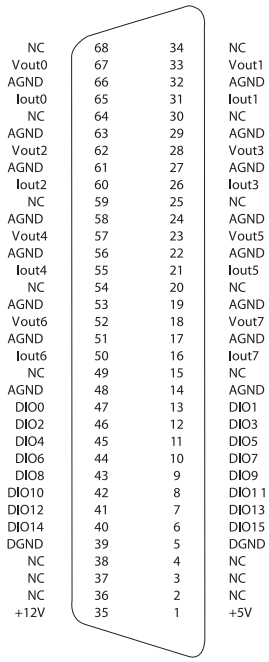
General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95 % RH non-condensing (IEC 68-2-3)
- **Certifications** CE

Ordering Information

- **PCI-1723** 16-bit, 8-ch Non-isolated Analog Output PCI Card
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

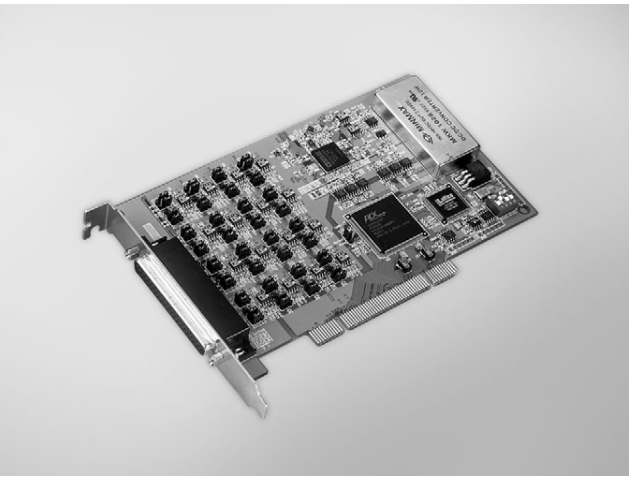
Pin Assignments



NC	68	34	NC
Vout0	67	33	Vout1
AGND	66	32	AGND
Iout0	65	31	Iout1
NC	64	30	NC
AGND	63	29	AGND
Vout2	62	28	Vout3
AGND	61	27	AGND
Iout2	60	26	Iout3
NC	59	25	NC
AGND	58	24	AGND
Vout4	57	23	Vout5
AGND	56	22	AGND
Iout4	55	21	Iout5
NC	54	20	NC
AGND	53	19	AGND
Vout6	52	18	Vout7
AGND	51	17	AGND
Iout6	50	16	Iout7
NC	49	15	NC
AGND	48	14	AGND
DIO0	47	13	DIO1
DIO2	46	12	DIO3
DIO4	45	11	DIO5
DIO6	44	10	DIO7
DIO8	43	9	DIO9
DIO10	42	8	DIO11
DIO12	41	7	DIO13
DIO14	40	6	DIO15
DGND	39	5	DGND
NC	38	4	NC
NC	37	3	NC
NC	36	2	NC
+12V	35	1	+5V

PCI-1724U

14-bit, 32-ch Isolated Analog Output Universal PCI Card



Features

- 32 high-density analog output channels
- Flexible Output Range: +/-10 V, 0 ~ 20 mA and 4 ~ 20 mA
- Synchronized output function
- Keeps the output settings and values after system hot reset
- BoardID™ switch

Introduction

PCI-1724U is an isolated high-density multiple channel analog output card for the PCI bus, where each analog output channel is equipped with a 14-bit DAC. It feaures optional voltages, current output and a BoardID™ switch. PCI-1724U is an ideal solution for industrial applications where multiple analog output channels are required.

Specifications

Analog Output

- **Channels** 32 isolated
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

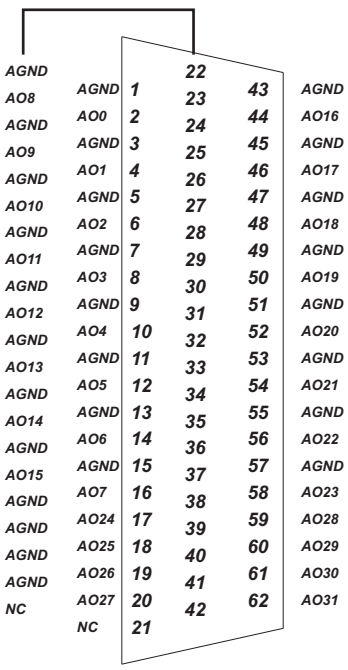
Internal Reference	**Bipolar (V)**	±10
	Current Loop (mA)	0 ~ 20, 4 ~ 20

- **Isolation Protection** 1,500 V_{DC} system isolation
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±4 LSB
  Differential Non-linearity: ±2 LSB (monotonic)
- **Driving Capacity** 10 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB62 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** 5 V @ 400 mA, 12 V @ 270 mA max.
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (refer to IEC 68-2-3)

Pin Assignments

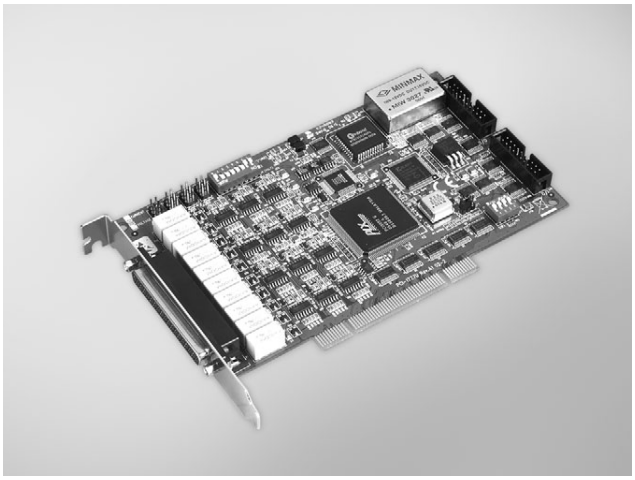

AGND AO8 AGND AO9 AGND AO10 AGND AO11 AGND AO12 AGND AO13 AGND AO14 AGND AO15 AGND AGND AGND NC
AGND AO0 AGND AO1 AGND AO2 AGND AO3 AGND AO4 AGND AO5 AGND AO6 AGND AO7 AO24 AO25 AO26 AO27 NC
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62
AGND AO16 AGND AO17 AGND AO18 AGND AO19 AGND AO20 AGND AO21 AGND AO22 AGND AO23 AO28 AO29 AO30 AO31

Ordering Information

- **PCI-1724U** 14-bit, 32-ch Isolated AO Universal PCI Card
- **PCL-10162-1** DB62 Cable, 1 m
- **PCL-10162-3** DB62 Cable, 3 m
- **ADAM-3962** DB62 DIN-rail Wiring Board

PCI-1727U

14-bit, 12-ch Analog Output Universal PCI Card with 32-ch Digital I/O



Features

- 12 independent analog output channels
- Fuse on each channel
- Universal PCI for 5 V and 3.3 V support
- BoardID™ switch
- Synchronized output function

Introduction

PCI-1727U provides twelve 14-bit analog output channels, and is pin-compatible with the ISA PCL-727 card for easy migration. It supports both ±10 V and 0 ~ 20 mA current loop (sink). The card's onboard DC-to-DC converter ensures the full 10 V D/A output is always available.

Each analog output channel has a built-in fuse to protect the circuit, PC and the external devices. PCI-1727U is an ideal, economical solution for the applications which require multiple PID control loops. In addition to its analog outputs, PCI-1727U provides 16 TTL digital input and 16 TTL digital output channels that are easily applied with industrial on/off control applications.

Specifications

Analog Output

- **Channels** 12
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Bipolar (V)	±5
Unipolar (V)	0 ~ 5, 0 ~10
Current Loop (mA)	4 ~ 20

- **Slew Rate** 0.7 V/μs
- **Driving Capability** 15 mA
- **Operation Modes** Software polling, synchronized output
- **Current Loop Excitation Voltage** 8 ~ 36 V

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Input loading** 0.5 V @ 0.4 mA max. (low)
2.7 V @ 50 μA max. (high)

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.8 mA @ 0.5 V
Source: 0.4 mA @ 2.4 V

General

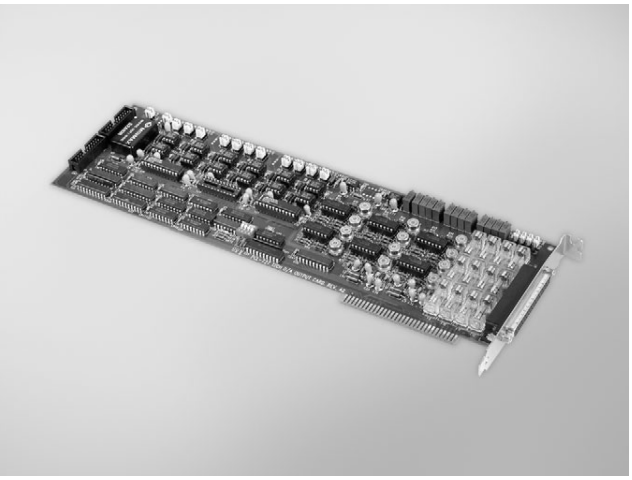
- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 37-pin D-type female connector
2 x 20-pin box header
- **Power Consumption** 5 V @ 460 mA typical, 500 mA max
12 V @ 150 mA typical,100 mA max
- **Dimensions (L x H)** 175 x 100 mm (6.9" x3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storing Temperature** -20 ~ 65° C (-4 ~ 149° F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1727U** 14-bit, 12-ch Universal Analog Output Card
- **PCL-10120-1** 20-pin flat cable, 1 m
- **PCL-10137-1** DB37 cable assembly, 1 m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting
- **PCLD-780** Two 20-pin screw terminal board
- **PCLD-782** Opto-isolated D/I board
- **PCLD-785** Relay output board

PCL-727

12-bit, 12-ch Analog Output ISA Card with 32-ch Digital I/O



Features

- 12 independent analog output channels
- Fuse on each channel
- BoardID™ switch
- Synchronized output function

Introduction

The PCL-727 provides 12 analog output channels on a full-size add-on card. In additional to its analog output, the PCL-727 provides 16 digital output channels and 16 digital output channels. It is an ideal and economical solution for industrial applications that requires multiple analog and/or current output channels.

Specifications

Analog Output

- **Channels** 12
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Bipolar (V)	±5
Unipolar (V)	0 ~ 5, 0 ~10
Current Loop (mA)	4 ~ 20

- **Driving Capability** 15 mA
- **Operation Modes** Software polling, synchronized output
- **Current Loop Excitation Voltage** 8 ~ 36 V

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Input loading** 0.5 V @ 0.4 mA max. (low)
2.7 V @ 50 µA max. (high)

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.8 mA @ 0.5 V
Source: 0.4 mA @ 2.4 V

General

- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
2 x 20-pin box header
- **Power Consumption** 5 V @ 500 mA typical, 1A max.
12 V @50 mA typical, 110 mA max.
-12 V @ 14 mA typical, 90 mA max.
- **Dimensions (L x H)** 340 x 100 mm (13.4" x 3.9")
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

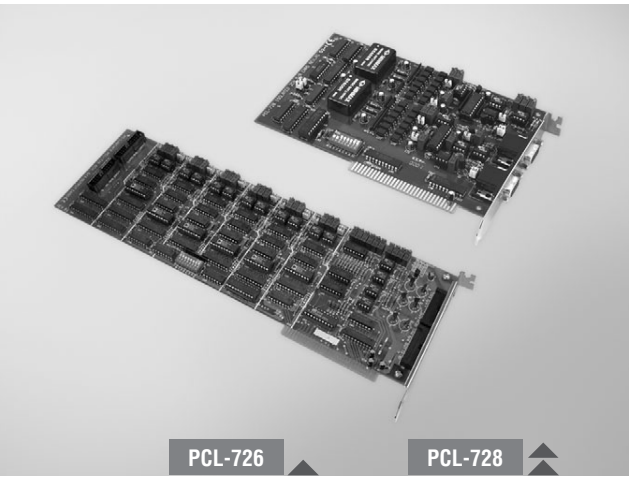
Ordering Information

- **PCL-727** 12-bit, 12-ch AO ISA Card w/ Digital I/O
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable

PCL-726
PCL-728

12-bit, 6-ch Analog Output ISA Card with 32-ch Digital I/O

12-bit, 2-ch Isolated Analog Output ISA Card



Features

- Independent analog output channels
- 12-bit resolution double-buffered D/A converter
- Multiple voltage ranges: ±10 V, ±5 V, 0 ~ 5 V, 0 ~ 10 V and 4 ~ 20 mA current loop (sink)
- 16 digital input and 16 digital output channels (PCL-726)
- Two DB9 connectors for easy wiring (PCL-728)

Introduction

PCL-726, and PCL-728 are analog output cards with 12-bit analog output channels. You can individually configure each channel to any of the following ranges: 0 ~ 5 V, 0~10 V, ±5 V, ±10 V and 4~20 mA current loop (sink). Designed for use in industrial environments, these cards are ideal, economical solutions for applications that require multiple analog outputs or current loops.

Specifications

Analog Output

- **Channels** PCL-726: 6
PCL-728: 2 isolated
- **Resolution** 12 bits, double buffered
- **Output Rate** Static update
- **Reference Voltage** Internal: -5 V (±0.05 V)
-10 V (±0.05 V)
External: DC or AC, ±10V max.
- **Output Range** (Software programmable)

Internal Reference	Bipolar (V)	±5
	Unipolar (V)	0 ~ 5, 0 ~10
	Current Loop (mA)	4 ~ 20
External Reference	Bipolar (V)	±10

- **Isolation Protection** 500 V_{DC} (PCL-728)
- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω
- **Operation Modes** Software polling
- **Accuracy** 0.012%
- **Excitation Voltage** 8 ~ 36 V for 4 ~ 20 mA current loop

Digital Input (PCL-726)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

Digital Output (PCL-726)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.5 V @ 0.4 mA max.
Source: 2.7 V @ 50 mA max.

General

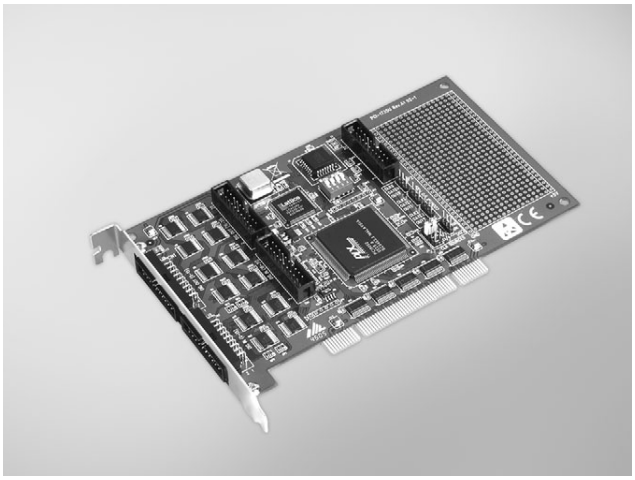
- **Bus Type** ISA
- **I/O Connectors** PCL-726: 4 x 20-pin box header
PCL-728: 2 x DB9 female connector
- **Dimensions (L x H)** PCL-726: 340 x 100 mm (13.4" x 3.9")
PCL-728: 184 x 119 mm (7.25" x 4.7")
- **Power Consumption**
PCI-726: 5 V @ 500 mA typical, 1 A max.
12 V @ 80 mA typical, 110 mA max.
12 V @ 60 mA typical, 90 mA max.
PCL-728: 5V @ 800 mA max.
- **Operating Temperature** 0 ~ 50° C (32 ~ 122° F)
- **Storage Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-726** 12-bit, 6-ch AO ISA Card w/ Digital I/O
- **PCL-728** 12-bit, 2-ch Isolated AO ISA Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter
- **ADAM-3909** DB9 DIN-rail Wiring Board
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board

PCI-1735U

64-ch Digital I/O and Counter Universal PCI Card



Features

- ISA-Compatible with PCL-720+
- 32 TTL-level digital input channels
- 32 TTL-level digital output channels
- High-output driving capacity
- Low-input loading
- 3 programmable counter/timer channels
- User configurable clock source
- Breadboard area for custom circuits

Introduction

The PCI-1735U digital I/O and counter card is PC-compatible add-on card with 32 digital input channels, 32 digital output channels and three programmable counter/timer channels. Their digital I/O channels are TTL-compatible and use 74LS244 driver/buffer circuits to provide high output driving capacity. These buffered circuits also require lower input loading current than regular TTL circuits. The cards' 8254 programmable counter/timer provides three flexible 16-bit counter/timer channels. You can generate waves and pulses by programming the 8254. Jumper settings determine the clock crystal frequency. The card also includes a breadboard area perfect for customized circuits.

Specifications

Digital Input

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V max @ 24 mA
  Source: 2.0 V min. @ 15 mA

Counter/Timer

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Reference Clock**
  Internal: Selectable 1 MHz, 100 kHz, or 10 kHz base clock
  External Clock Frequency: Jumper selectable divider: x2, x1, x0.5, and x0.25
- **Programmable Counter Modes** 6

General

- **Breadboard Area** 540 (30 x 18) plated-through "donuts", each with a .036" hole on 0.10" centers. Further, provide 5 V on the left side, and provide GND on the right side
- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 5 x 20-pin box header
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Max.: 5 V @ 98.8 mA
- **Operating Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Storing Temperature** -25 ~ 80° C (-13 ~ 176° F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

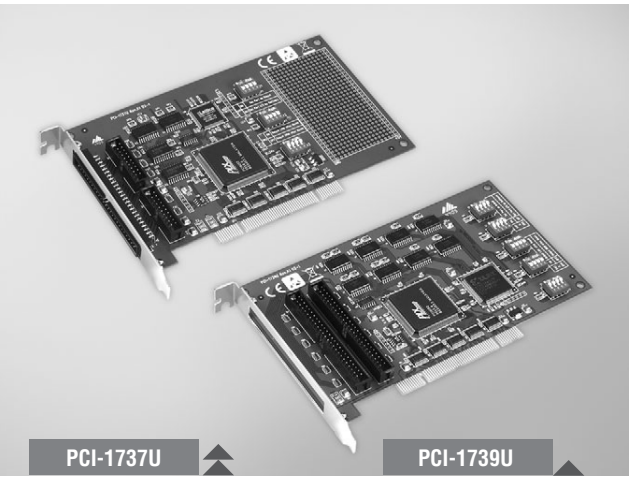
Ordering Information

- **PCI-1735U** 64-ch Digital I/O and Counter Card
- **PCL-10120-1** IDC-20 Flat Cable, 1 m
- **PCL-10120-2** IDC-20 Flat Cable, 2 m
- **PCLD-780** 2 x IDC-20 Wiring Terminal
- **PCLD-782** Opto-Isolated D/I Board
- **PCLD-785** 16-ch Relay Output Terminal
- **PCLD-786** SSR and Relay Driver Board
- **PCLD-885** 16-ch Power Relay Output Terminal
- **ADAM-3920** 20-Pin Flat Cable Terminal, DIN-rail Mount

PCI-1737U
PCI-1739U

24-ch Digital I/O Universal PCI Card

48-ch Digital I/O Universal PCI Card



Features

- ISA-Compatible with PCL-724(PCI-1737U) and PCL-731(PCI-1739U)
- 24 TTL digital I/O channels for PCI-1737U and 48 TTL digital I/O channels for PCI-1739U
- Emulates mode 0 of 8255 PPI
- Interrupt handling capability
- Opto-22 compatible 50-pin connectors
- Output status readback
- PCI universal card

Specifications

Digital Input

- **Channels** PCI-1737U: 24 (shared with output)
  PCI-1739U: 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** PCI-1737U: 1
  PCI-1739U: 2

Digital Output

- **Channels** PCI-1737U: 24 (shared with input)
  PCI-1739U: 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V max. @ 24 mA
  Source: 2.4 V min. @ 15 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** PCI-1737U: 2 x 20-pin & 1 x 50-pin box header
  PCI-1739U: 2 x 50-pin box header
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** PCI-1737U: 5 V @ 294.9 mA (max.)
  PCI-1739U: 5 V @ 540.8 mA (max.)
- **Operating Temperature** 0 ~ 65° C (32 ~ 149° F)
- **Storage Temperature** -25 ~ 80° C (-13 ~ 176° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1737U** 24-ch Digital I/O Universal PCI Card
- **PCI-1739U** 48-ch Digital I/O Universal PCI Card
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

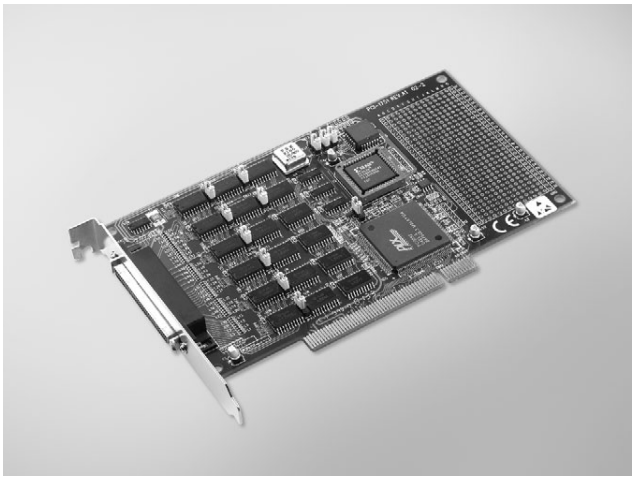
Pin Assignments

CN1				CN2			
PC 07	1	2	GND	PC 17	1	2	GND
PC 06	3	4	GND	PC 16	3	4	GND
PC 05	5	6	GND	PC 15	5	6	GND
PC 04	7	8	GND	PC 14	7	8	GND
PC 03	9	10	GND	PC 13	9	10	GND
PC 02	11	12	GND	PC 12	11	12	GND
PC 01	13	14	GND	PC 11	13	14	GND
PC 00	15	16	GND	PC 10	15	16	GND
PB 07	17	18	GND	PB 17	17	18	GND
PB 06	19	20	GND	PB 16	19	20	GND
PB 05	21	22	GND	PB 15	21	22	GND
PB 04	23	24	GND	PB 14	23	24	GND
PB 03	25	26	GND	PB 13	25	26	GND
PB 02	27	28	GND	PB 12	27	28	GND
PB 01	29	30	GND	PB 11	29	30	GND
PB 00	31	32	GND	PB 10	31	32	GND
PA 07	33	34	GND	PA 17	33	34	GND
PA 06	35	36	GND	PA 16	35	36	GND
PA 05	37	38	GND	PA 15	37	38	GND
PA 04	39	40	GND	PA 14	39	40	GND
PA 03	41	42	GND	PA 13	41	42	GND
PA 02	43	44	GND	PA 12	43	44	GND
PA 01	45	46	GND	PA 11	45	46	GND
PA 00	47	48	GND	PA 10	47	48	GND
+5 V	49	50	GND	+5 V	49	50	GND

***Note: CN2 is only for PCI-1739U**

PCI-1751

48-ch Digital I/O and 2-ch Counter PCI Card



Features

- 48 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- BoardID switch

Introduction

PCI-1751 is a 48-bit digital I/O card for the PCI bus. Its 48 bits are divided into six 8-bit I/O ports and users can configure each port as input or output via software. PCI-1751 also provides one event counter and two 16-bit timers, which can be cascaded to become a 32-bit timer.

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2 V min.
- **Interrupt Capable Ch.** 4

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 24 mA
Source: 2.4 V @ 15 mA

Counter/Timer

- **Channels** 3
- **Resolution** 2 x 16-bit counters, or 1 x 32-bit counter (jumper selectable)
1 x 16-bit event counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
External Clock Frequency: 10 MHz
External Voltage Range: 5 V/TTL

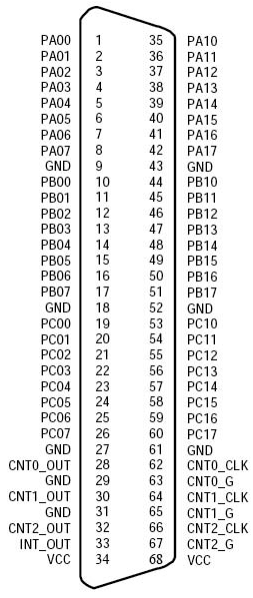
General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
- **Storage Temperature** -20 ~ 80° C (-4 ~ 176° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1751** 48-ch Digital I/O and Counter PCI Card
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board

Pin Assignments

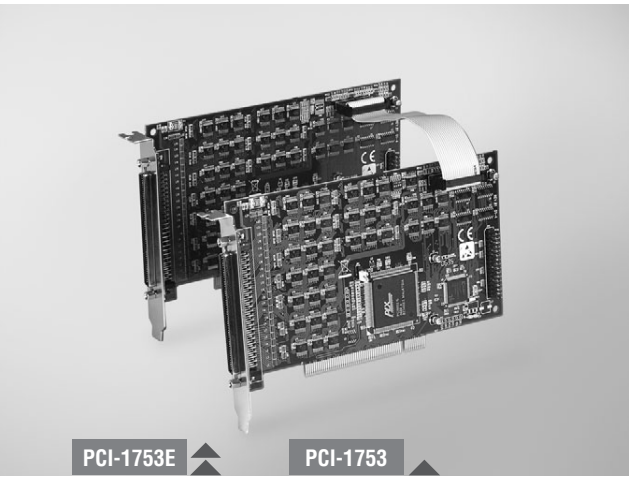


PA00	1	35	PA10
PA01	2	36	PA11
PA02	3	37	PA12
PA03	4	38	PA13
PA04	5	39	PA14
PA05	6	40	PA15
PA06	7	41	PA16
PA07	8	42	PA17
GND	9	43	GND
PB00	10	44	PB10
PB01	11	45	PB11
PB02	12	46	PB12
PB03	13	47	PB13
PB04	14	48	PB14
PB05	15	49	PB15
PB06	16	50	PB16
PB07	17	51	PB17
GND	18	52	GND
PC00	19	53	PC10
PC01	20	54	PC11
PC02	21	55	PC12
PC03	22	56	PC13
PC04	23	57	PC14
PC05	24	58	PC15
PC06	25	59	PC16
PC07	26	60	PC17
GND	27	61	GND
CNT0_OUT	28	62	CNT0_CLK
GND	29	63	CNT0_G
CNT1_OUT	30	64	CNT1_CLK
GND	31	65	CNT1_G
CNT2_OUT	32	66	CNT2_CLK
INT_OUT	33	67	CNT2_G
VCC	34	68	VCC

PCI-1753
PCI-1753E

96-ch Digital I/O PCI Card

96-ch Digital I/O Extension Card for PCI-1753



Features

- Up to 96 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Multiple-source interrupt handling capability
- Interrupt output pin for simultaneously triggering external devices with the interrupt
- Output status read-back
- "Pattern match" and "Change of state" interrupt functions for critical I/O monitoring
- Keeps the output settings and values after system hot reset
- Supports both dry and wet contact
- High-density 100-pin SCSI connector

Introduction

PCI-1753 is a 96-bit digital I/O card for the PCI bus, which can be extended to 192 digital I/O channels by connecting its extension board - PCI-1753E. The card emulates mode 0 of the 8255 PPI chip, but the buffered circuits offer a higher driving capability than the 8255. The 96 I/O lines are divided into twelve 8-bit I/O ports: A0, B0, C0, A1, B1, C1, A2, B2, C2, A3, B3 and C3. You can configure each port as input or output via software.

Specifications

Digital Input/Output

- **Channels** — 96 digital I/O lines for PCI-1753
192 digital I/O lines if extending with PCI-1753E
- **Programming Mode** — 8255 PPI mode 0
- **Compatibility** — 5 V/TTL
- **Input Voltage** — Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Voltage** — Logic 0: 0.44 V max.
Logic 1: 3.76 V min.
- **Output Capability** — Sink: 0.44 V max. @ 24 mA
Source: 3.76 V min. @ 24 mA

General

- **Bus Type** — PCI V2.2
- **I/O Connector** — 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** — 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** — Typical: 5 V @ 400 mA
Max.: 5 V @ 2.7 A
- **Operating Temperature** — 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** — -20 ~ 70° C (-4 ~ 158° F) (refer to IEC 68-2-3)
- **Storage Humidity** — 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1753** — 96-ch Digital I/O PCI Card
- **PCI-1753E** — Extension Board for PCI-1753
- **ADAM-3968** — 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** — 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** — 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** — 48-ch Isolated Digital Input Board
- **PCLD-8761** — 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** — 48-ch Relay Board
- **PCL-10268** — 100-pin to Two 68-pin SCSI Cables, 1 m and 2 m

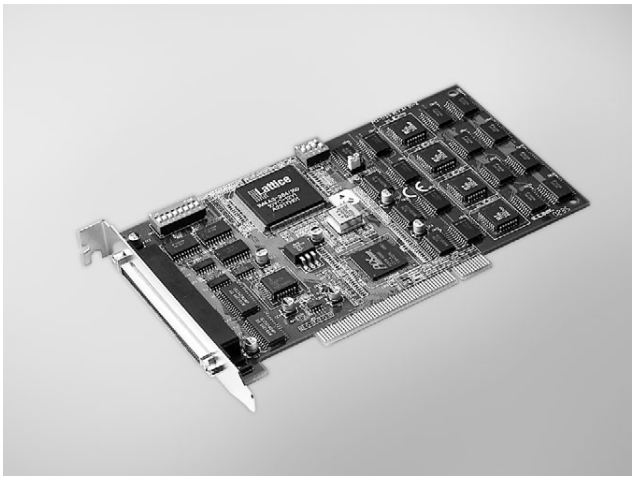
Pin Assignments

PA00	1	51	PA20
PA01	2	52	PA21
PA02	3	53	PA22
PA03	4	54	PA23
PA04	5	55	PA24
PA05	6	56	PA25
PA06	7	57	PA26
PA07	8	58	PA27
PB00	9	59	PB20
PB01	10	60	PB21
PB02	11	61	PB22
PB03	12	62	PB23
PB04	13	63	PB24
PB05	14	64	PB25
PB06	15	65	PB26
PB07	16	66	PB27
PC00	17	67	PC20
PC01	18	68	PC21
PC02	19	69	PC22
PC03	20	70	PC23
PC04	21	71	PC24
PC05	22	72	PC25
PC06	23	73	PC26
PC07	24	74	PC27
GND	25	75	GND
PA10	26	76	PA30
PA 11	27	77	PA31
PA12	28	78	PA32
PA13	29	79	PA33
PA14	30	80	PA34
PA15	31	81	PA35
PA16	32	82	PA36
PA17	33	83	PA37
PB10	34	84	PB30
PB1 1	35	85	PB31
PB12	36	86	PB32
PB13	37	87	PB33
PB14	38	88	PB34
PB15	39	89	PB35
PB16	40	90	PB36
PB17	41	91	PB37
PC10	42	92	PC30
PC1 1	43	93	PC31
PC12	44	94	PC32
PC13	45	95	PC33
PC14	46	96	PC34
PC15	47	97	PC35
PC16	48	98	PC36
PC17	49	99	PC37
VCC	50	100	VCC

PA00 ~PA07: I/O pins of Port A0
PA10 ~PA17: I/O pins of Port A1
PA20 ~PA27: I/O pins of Port A2
PA30 ~PA37: I/O pins of Port A3
PB00 ~PB07: I/O pins of Port B0
PB10 ~PB17: I/O pins of Port B1
PB20 ~PB27: I/O pins of Port B2
PB30 ~PB37: I/O pins of Port B3
PC00 ~PC07: I/O pins of Port C0
PC10 ~PC17: I/O pins of Port C1
PC20 ~PC27: I/O pins of Port C2
PC30 ~PC37: I/O pins of Port C3
GND: Ground
VCC: +5V voltage output

PCI-1755

80 MB/s, 32-ch Digital I/O PCI Card



Features

- Bus-mastering DMA data transfer with scatter gather technology
- 32/16/8-bit pattern I/O with start and stop trigger function, 2 modes handshaking I/O Interrupt handling capability
- Onboard active terminators for high speed and long distance transfer
- Pattern match and change state detection interrupt function
- General-purpose 8-ch digital I/O

Introduction

The PCI-1755 supports PCI-bus mastering DMA for high-speed data transfer. By setting aside a block of memory in the PC, the PCI-1755 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Specifications

Digital Input

- **Channels** General: 8 (shared with output)
High speed: 32 (shared with output)
- **Compatibility** 5V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** DIO0~DIO7

Digital Output

- **Channels** General: 8 (shared with input)
High speed: 32 (shared with input)
- **Compatibility** 5V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
Logic 1: 2.7 V min.
- **Output Capacity** Sink: 0.5 V max. @ 48 A
Source: 2.4 V min. @ 15 A

Transfer Characteristics

- **Onboard FIFO** 16 KB for DI & 16 KB DO channels
- **Data Transfer Mode** Bus Mastering DMA with Scatter-Gather
- **Data Transfer Bus Width** 8/16/32 bits (programmable)
- **Max. Transfer Rate** DI: 80 M bytes/sec, 32-bit @ 20 MHz
120 M bytes/sec, 32-bit @ 40 MHz
external pacer when data length is less than FIFO size
DO: 80 MBytes/sec, 32-bit @ 20 MHz
- **Operation Mode** Handshaking

General

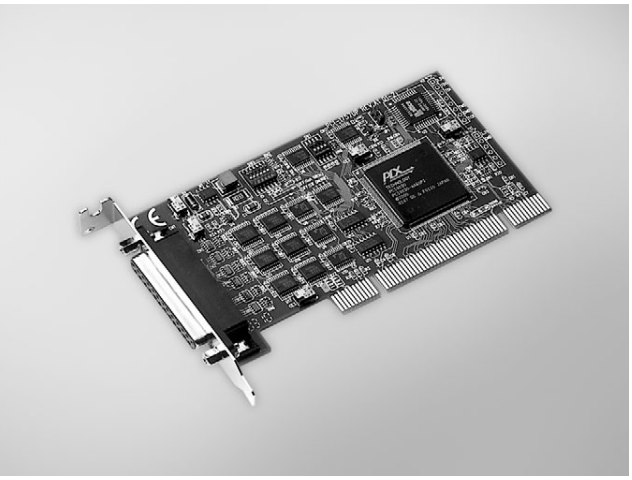
- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 1 A
Max.: 5 V @ 1 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 85° C (-4 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1755** Ultra-speed 32-ch Digital I/O Card
- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board
- **PCL-101100-1** SCSI Cable 100-pin Male 1m w/ Bolt Screw, 1m

PCI-1757UP

24-ch Digital I/O Low Profile Universal PCI Card



Features

- Low profile PCI form factor
- Universal PCI bus
- 24 TTL level digital I/O channels
- Emulates mode 0 of 8255 PPI
- Buffered circuits provide higher driving capability
- Output status read-back
- I/O configurable by software or on board DIP switch
- Keeps the output settings and values after system hot reset
- BoardID™ switch
- Convenient DB25 connector
- Supports both dry and wet contact

Introduction

PCI-1757UP is a 24-channel digital I/O low profile PCI card that meets the PCI standard REV.2.2 (universal PCI expansion card). The card also works with 3.3 V and 5 V PCI slots, and provides you with 24 parallel digital input/output channels that emulate mode 0 of the 8255 PPI chip. However, the buffered circuits offer a higher driving capability than the 8255.

Specifications

Digital Input

- **Channels** 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V @ -0.2 mA
  Logic 1: 2.0 V @ 20 mA
- **Interrupt Capable Ch.** 2

Digital Output

- **Channels** 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max. @ -24 mA
  Logic 1: 3.7 V max. @ 24 mA
- **Output Capability** Sink: 24 mA
  Source: 15 mA

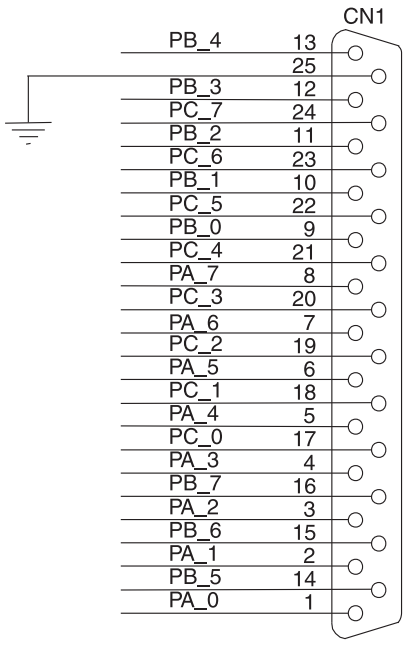
General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB25 female connector
- **Dimensions (L x H)** 120 x 64 mm (4.7" x 2.5") Low profile MD1
- **Power Consumption** Typical: 5 V @ 140 mA
  Max.: 5 V @ 200 mA
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
- **Storage Temperature** -20 ~ 80° C(-4 ~ 176° F)
- **Storage Humidity** 5 ~ 95% non-condensing

Ordering Information

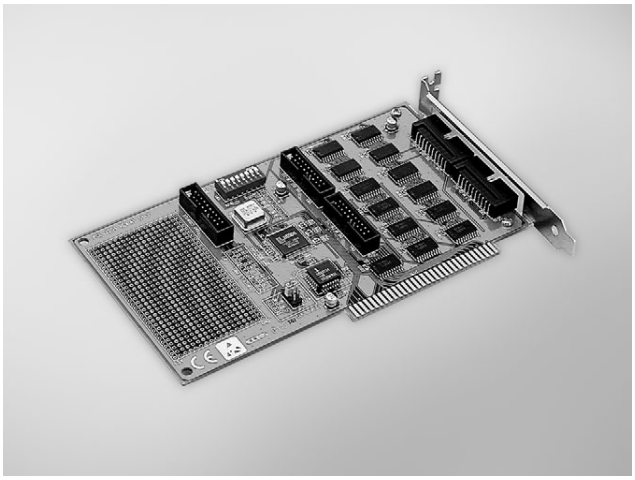
- **PCI-1757UP** 24-ch Digital I/O Low Profile Universal PCI Card
- **ADAM-3925** DB25 DIN-rail Wiring Board
- **PCL-10125-1** DB25 Cable, 1 m
- **PCL-10125-3** DB25 Cable, 3 m
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Pin Assignments



PCL-720+

64-ch Digital I/O and Counter ISA Card



Features

- 32 TTL-level digital input channels
- 32 TTL-level digital output channels
- High-output driving capacity
- Low-input loading
- 3 programmable counter/timer channels
- User configurable clock source
- Breadboard area for custom circuits

Introduction

The PCL-720+ digital I/O and counter card is PC-compatible add-on cards with 32 digital input channels, 32 digital output channels and three programmable counter/timer channels. Their digital I/O channels are TTL-compatible and use 74LS244 driver/ buffer circuits to provide high output driving capacity. These buffered circuits also require lower input loading current than regular TTL circuits. The cards' 8254 programmable counter/timer provides three flexible 16-bit counter/timer channels. You can generate waves and pulses by programming the 8254. Jumper settings determine the clock crystal frequency. The cards also includes a breadboard area perfect for customized circuits.

Specifications

Digital Input

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 32
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V max. @ 24 mA
  Source: 2.0 V min. @ 15 mA

Counter/Timer

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Reference Clock**
  Internal: Selectable 1 MHz, 100 kHz, or 10 kHz base clock
  External Clock Frequency: Jumper selectable divider: x2, x1, x0.5, and x0.25
- **Programmable Counter Modes** 6

General

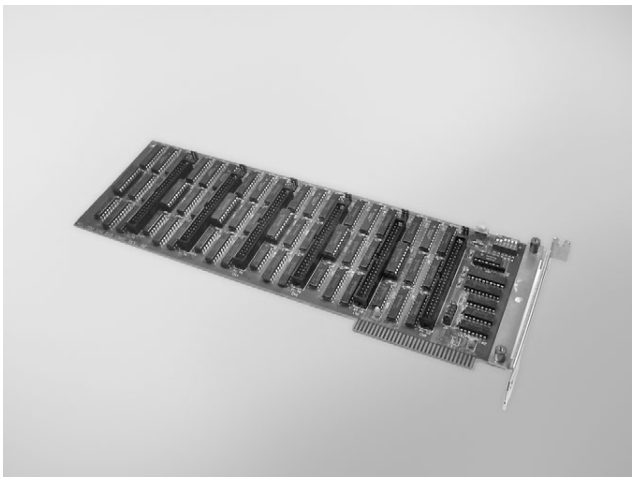
- **Breadboard Area** 540 (30 x 18) plated-through "donuts", each with a .036" hole on 0.10" centers. Further, provide 5 V on the left side, and provide GND on the right side
- **Bus Type** ISA
- **I/O Connectors** 5 x 20-pin box header
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 4")
- **Power Consumption** 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-720+** 64-ch Digital I/O and Counter ISA Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-782** 16-ch Isolated DI Board w/ 1 m 20-pin Flat Cable
- **PCLD-785** 16-ch Relay Board w/ One 1 m 20-pin Flat Cable
- **PCLD-786** 8-ch SSR I/O Module Board w/ 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board

PCL-722

144-ch Digital I/O ISA Card



Features

- Emulates 8255 PPI mode 0
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Output status readback
- Pin compatible with Opto-22 I/O module racks

Specifications

Digital Input

- **Channels** 144 (24 channels x 6 ports) shared with output
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** Bits 0 and 3 of Port C can generate an interrupt to IRQ 2, 3, 4, 5, 6 or 7

Digital Output

- **Channels** 144 (24 channels x 6 ports) shared with input
- **Compatibility** 5 V/TTL
- **Output Voltage**
  Port A, B: Logic 0: 0.5 V max.
  Logic 1: 2.4 V min.
  Port C: Logic 0: 0.4 V max.
  Logic 1: 2.0 V min.
- **Output Capability**
  Port A, B: Sink: 12 mA
  Source: 8 mA
  Port C: Sink: 24 mA
  Source: 15 mA

General

- **Bus Type** ISA
- **Power Consumption** Typical: 5 V @ 1.3 A
  Max.: 5 V @ 1.8 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **I/O Connectors** 6 x 50-pin box header
- **Dimensions (L x H)** 334 x 100 mm (13.2" x 3.9")

Ordering Information

PCL-722	144-ch Digital I/O ISA Card
PCL-10150-1.2	50-pin Flat Cable, 1.2 m
PCLD-782B	24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
PCLD-785B	24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
PCLD-7216	16-ch SSR I/O Module Carrier Board
PCLD-885	16-ch Power Relay Board w/ 20p & 50p Flat Cables
ADAM-3950	50-pin DIN-rail Flat Cable Wiring Board

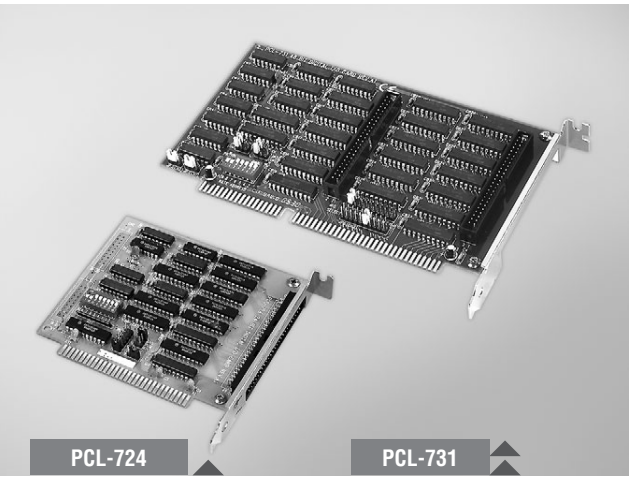
Pin Assignments

PC 7	1	2	GND
PC 6	3	4	GND
PC 5	5	6	GND
PC 4	7	8	GND
PC 3	9	10	GND
PC 2	11	12	GND
PC 1	13	14	GND
PC 0	15	16	GND
PB 7	17	18	GND
PB 6	19	20	GND
PB 5	21	22	GND
PB 4	23	24	GND
PB 3	25	26	GND
PB 2	27	28	GND
PB 1	29	30	GND
PB 0	31	32	GND
PA 7	33	34	GND
PA 6	35	36	GND
PA 5	37	38	GND
PA 4	39	40	GND
PA 3	41	42	GND
PA 2	43	44	GND
PA 1	45	46	GND
PA 0	47	48	GND
+5V	49	50	GND

PCL-724
PCL-731

24-ch Digital I/O ISA Card

48-ch Digital I/O ISA Card



Features

- 24 TTL digital I/O channels for PCL-724 and 48 TTL digital I/O channels for PCL-731
- Emulates mode 0 of 8255 PPI
- Interrupt handling capability
- Opto-22 compatible 50-pin connectors
- Output status readback

Specifications

Digital Input

- **Channels** PCL-724: 24 (shared with output)
PCL-731: 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** PCL-724: 1
PCL-731: 2

Digital Output

- **Channels** PCL-724: 24 (shared with input)
PCL-731: 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V max. @ 24 mA
Source: 2.4 V min. @ 15 mA

General

- **Bus Type** ISA
- **I/O Connectors** PCL-724: 1 x DB50 female connector
PCL-731: 2 x 50-pin box header
- **Dimensions (L x H)** PCL-724: 125 x 100 mm (4.9" x 3.9")
PCL-731: 185 x 100 mm (7.3" x 3.9")
- **Power Consumption** Typical: 5 V @ 0.5 A
Max.: 5 V @ 0.8 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCL-724** 24-ch Digital I/O ISA Card
- **PCL-731** 48-ch Digital I/O ISA Card
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

Pin Assignments

CN1				CN2			
PC 07	1	2	GND	PC 17	1	2	GND
PC 06	3	4	GND	PC 16	3	4	GND
PC 05	5	6	GND	PC 15	5	6	GND
PC 04	7	8	GND	PC 14	7	8	GND
PC 03	9	10	GND	PC 13	9	10	GND
PC 02	11	12	GND	PC 12	11	12	GND
PC 01	13	14	GND	PC 11	13	14	GND
PC 00	15	16	GND	PC 10	15	16	GND
PB 07	17	18	GND	PB 17	17	18	GND
PB 06	19	20	GND	PB 16	19	20	GND
PB 05	21	22	GND	PB 15	21	22	GND
PB 04	23	24	GND	PB 14	23	24	GND
PB 03	25	26	GND	PB 13	25	26	GND
PB 02	27	28	GND	PB 12	27	28	GND
PB 01	29	30	GND	PB 11	29	30	GND
PB 00	31	32	GND	PB 10	31	32	GND
PA 07	33	34	GND	PA 17	33	34	GND
PA 06	35	36	GND	PA 16	35	36	GND
PA 05	37	38	GND	PA 15	37	38	GND
PA 04	39	40	GND	PA 14	39	40	GND
PA 03	41	42	GND	PA 13	41	42	GND
PA 02	43	44	GND	PA 12	43	44	GND
PA 01	45	46	GND	PA 11	45	46	GND
PA 00	47	48	GND	PA 10	47	48	GND
+5 V	49	50	GND	+5 V	49	50	GND

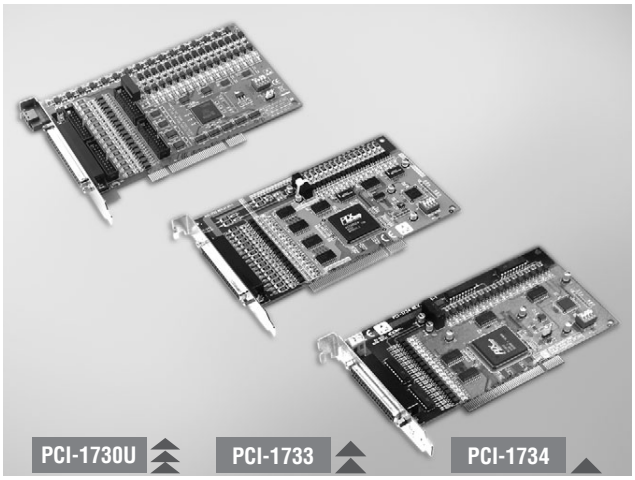
***Note: CN2 is only for PCL-731**

PCI-1730U
PCI-1733
PCI-1734

32-ch Isolated Digital I/O Universal PCI Card

32-ch Isolated Digital Input PCI Card

32-ch Isolated Digital Output PCI Card



Features

- ISA-compatible with PCL-730/733/734
- 32-ch isolated DI/O (16-ch digital input, 16-ch digital output)
- 32-ch TTL DI/O (16-ch digital input,16-ch digital output) (PCI-1730U only)
- High output driving capacity
- Interrupt handling capability
- 2 x 20-pin connectors for isolated DI/O channels and 2 for TTL DI/O channels
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels

Introduction

PCI-1730U, PCI-1733, and PCI-1734 offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL digital I/O channels on PCI-1730U.

Specifications

Digital Input (PCI-1730U only)

- **Channels** 16 (16-ch/group)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2 (DI0, DI1)

Isolated Digital Input

- **Channels** 16 (16-ch/group)
- **Input Voltage** Logic 0: 1 V max. (2 V max.)
Logic 1: 5V min. (30 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI1)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2.7 kΩ @ 1 W

Digital Output (PCI-1730U only)

- **Channels** 16 (16-ch/group)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 24 mA
Source: 15 mA

Isolated Digital Output

- **Channels** 16 (16-ch/group)
- **Output Type** Sink type (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 300 mA max./channel
- **Opto-Isolator Response** 25 µs

General

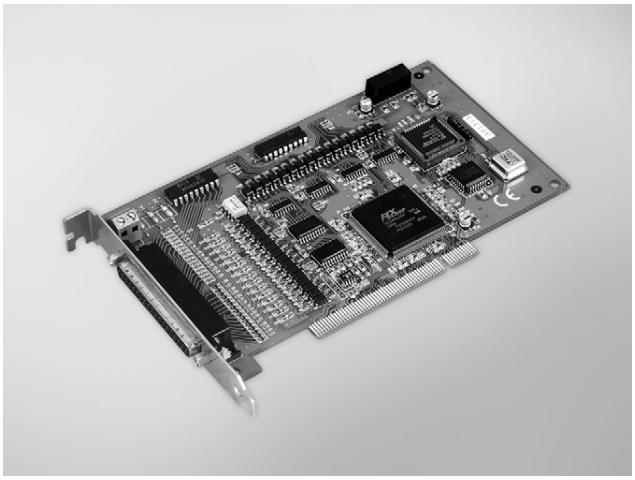
- **Bus Type** PCI V2.2 (Universal PCI V2.2 for PCI-1730U)
- **I/O Connectors** 1 x DB37 female connector
4 x 20-pin box header (1730U only)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 250 mA, 12 V @ 35 mA
Max.: 5 V @ 400 mA, 12 V @ 60 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -25 ~ 85° C (-13 ~ 185° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (see IEC 68-2-3)

Ordering Information

- **PCI-1730U** 32-ch Isolated Digital I/O Univ. PCI Card
- **PCI-1733** 32-ch Isolated Digital Input PCI Card
- **PCI-1734** 32-ch Isolated Digital Output PCI Card
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-786** 8-ch SSR I/O Module Board w/ 20-pin Flat Cable
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m

PCI-1750

32-ch Isolated Digital I/O and 3-ch Counter PCI Card



Features

- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all isolated channels (2,500 V_{DC})
- High sink current on isolated output channels (200 mA/channel)
- Supports dry contact or 5 ~ 50 V_{DC} isolated inputs
- Interrupt handling capability
- Timer/counter interrupt capability

Introduction

PCI-1750 offers 16 isolated digital input channels, 16 isolated digital output channels, and one isolated counter/timer for the PCI bus. With isolation protection of 2,500 V_{DC}, and dry contact support, PCI-1750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the PCI-1750 corresponds to a bit in a PC I/O port. This makes PCI-1750 very easy to program. This card also offers a counter or timer interrupt and two digital input interrupt lines to a PC. So you can then easily do configurations by software.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 2 V max.
  Logic 1: 5 V min. (50 V_{DC} max.) or dry contact
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max. per channel
- **Opto-Isolator Response** 100 µs

Counter/Timer

- **Channels** 1
- **Resolution** 1 x 32-bit timer
  1 x 16-bit isolated counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Isolation Protection** 2,500 V_{DC}

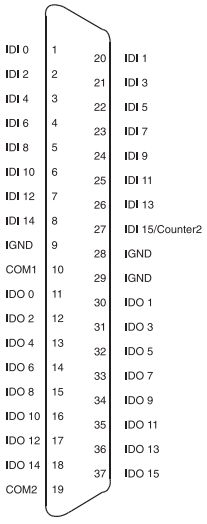
General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
  1 x 2-pin terminal block for extended ground
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70° C (32 ~ 158° F)
- **Storage Temperature** -20 ~ 80° C (-4 ~ 176° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

- **PCI-1750** 32-ch Isolated Digital I/O and Counter PCI Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

Pin Assignments

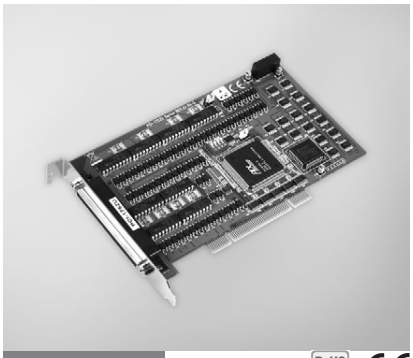


PCI-1752U
PCI-1754
PCI-1756

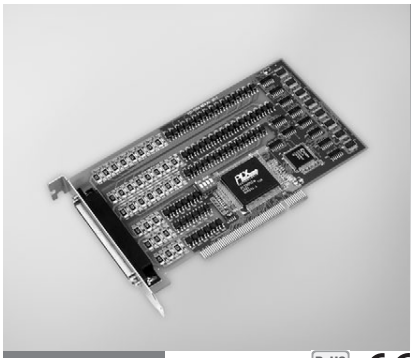
64-ch Isolated Digital Output Universal PCI Card

64-ch Isolated Digital Input PCI Card

64-ch Isolated Digital I/O PCI Card



PCI-1752U



PCI-1754

PCI-1756

Features

- 64 isolated digital output channels
- High-voltage isolation on output channels (2,500 V_{DC})
- 2,000 V_{DC} ESD protection
- Wide output range (5 ~ 40 V_{DC})
- High-sink current on isolated output channels (200 mA max./channel)
- Output status readback
- Keeps the output settings and values after system hot reset
- Channel-freeze function
- High-density 100-pin SCSI connector
- Support sink

Specifications

Isolated Digital Output

- **Channels** 64 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 230 mA
Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
(IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, (IEC 68-2-3)
non-condensing

Ordering Information

- **PCI-1752U** 64-ch Isolated Digital Output Universal PCI Card
- **PCL-10250-1** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- 64 isolated digital input channels
- Either ± voltage input for DI by group
- High-voltage isolation on input channels (2,500 V_{DC})
- High over-voltage protection (70 V_{DC})
- Wide input range (10 ~ 50 V_{DC})
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 64 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 10 V min.
(50 V max.)
- **Input Current (Typical)** 10 V_{DC} @ 1.7 mA,
12 V_{DC} @ 2.1 mA
24 V_{DC} @ 4.4 mA,
48 V_{DC} @ 9.0 mA
50 V_{DC} @ 9.4 mA
- **Interrupt Capable Ch.** 4
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 340 mA
Max.: 5 V @ 450 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
(IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH (IEC 68-2-3)
non-condensing

Ordering Information

- **PCI-1754** 64-ch Isolated Digital Input PCI Card
- **PCL-10250-1** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- Either ± voltage input for DI by group
- Output status readback
- Keeps the output settings and values after system hot reset
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 32 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI16)
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Current** 10 V_{DC} @ 1.7 mA,
12 V_{DC} @ 2.1 mA
24 V_{DC} @ 4.4 mA,
48 V_{DC} @ 9.0 mA
50 V_{DC} @ 9.4 mA

Isolated Digital Output

- **Channels** 32 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

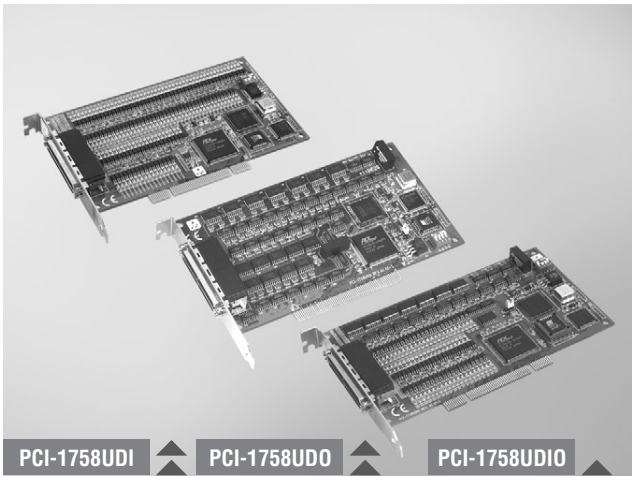
- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 285 mA
Max.: 5 V @ 475 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
(IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % (IEC 68-2-3)
non-condensing

Ordering Information

- **PCI-1756** 64-ch Isolated Digital I/O PCI Card
- **PCL-10250-1** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

PCI-1758UDI
PCI-1758UDO
PCI-1758UDIO

128-ch Isolated Digital Input Universal PCI Card
128-ch Isolated Digital Output Universal PCI Card
128-ch Isolated Digital I/O Universal PCI Card



Features

PCI-1758UDO and PCI-1758UDIO

- 128 isolated digital output channels (64 channels for PCI-1758UDIO)
- High-voltage isolation on output channels (2,500 V_{DC})
- Wide output range (5 ~ 40 V_{DC})
- High-sink current for isolated output channels (90 mA max./channel)
- Current protection for each port
- BoardID™ switch
- Output status read-back
- Digital output value retained after hot system reset
- Programmable Power-up States
- Watchdog timer

PCI-1758UDI and PCI-1758UDIO

- 128 isolated digital input channels (64 channels for PCI-1758UDIO)
- Wide input range (5 ~ 25 V_{DC})
- High ESD protection (2,000 V_{DC})
- Digital Filter function
- BoardID™ switch
- Interrupt handling capability for each channel

Specifications

Isolated Digital Input

- **Channels** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Input Voltage** Logic 0: 2.5 V max.
Logic 1: 5 V min. (25 V max.)
- **Interrupt Capable Ch.** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 20 µs
- **Input Resistance** 3 kΩ

Isolated Digital Output

- **Channels** PCI-1758UDO: 128
PCI-1758UDIO: 64
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 90 mA max./channel
- **Opto-isolator Response** 20 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x mini-SCSI HDRA-E100 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**

	PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO
Typical	5 V @ 0.3 A	5 V @ 1.1 A	5 V @ 1.2 A
Max.	5 V @ 0.6 A	5 V @ 2.2 A	5 V @ 1.8 A

- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % (IEC 68-2-3) non-condensing

Ordering Information

- **PCI-1758UDI** 128-ch Isolated DI Universal PCI Card
- **PCI-1758UDO** 128-ch Isolated DO Universal PCI Card
- **PCI-1758UDIO** 128-ch Isolated Digital I/O Universal PCI Card
- **PCL-101100S-1** 100-pin SCSI Cable, 1 m
- **PCL-101100S-2** 100-pin SCSI Cable, 2 m
- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board

Feature Details

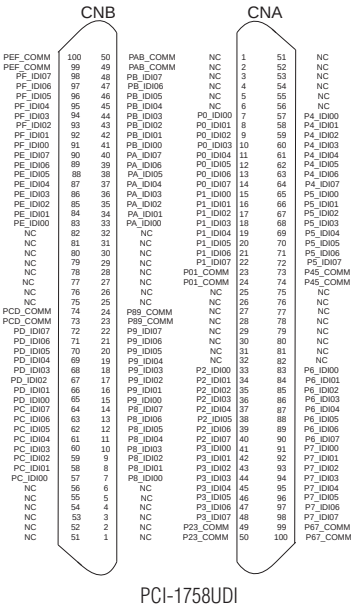
Interrupt Function (PCI-1758UDI/PCI-1758UDIO)

PCI-1758UDI and PCI-1758UDIO provide an interrupt function for every digital input channel. You can disable/enable the interrupt functions, and select trigger type by setting the Rising Edge Interrupt Registers or Falling Edge Interrupt Registers of the card. When the interrupt request signals occur, software will service these interrupt requests by ISR. The multiple interrupt sources provide the card with more flexibility.

Digital Filter Function (PCI-1758UDI/PCI-1758UDIO)

The digital filter function is used to eliminate glitches on input data and reduce the number of changes to examine and process. The filter blocks pulses that are shorter than the specified timing interval and passes pulses that are twice as long as the specified interval. Intermediate-length pulses that are longer than half of the interval, but less than the interval, may or may not pass the filter depending on your settings.

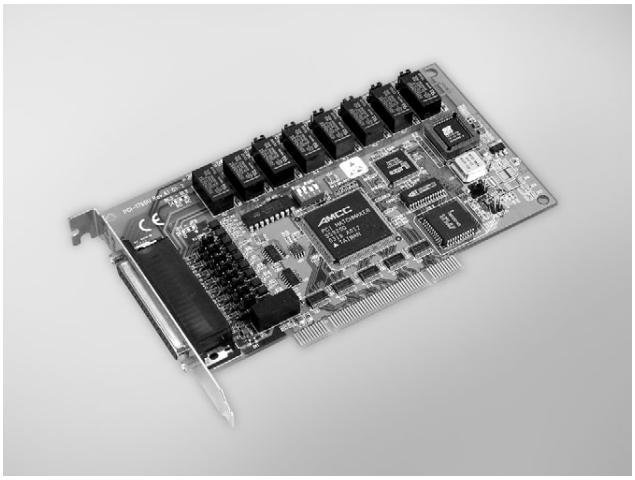
Pin Assignments



PCI-1758UDI

PCI-1760U

8-ch Relay and 8-ch Isolated Digital Input Universal PCI Card with 10-ch Counter/Timer



Features

- Universal PCI card, for 3.3 V and 5 V PCI slot
- 8 opto-isolated digital input channels
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- Universal PCI and BoardID switch

Introduction

PCI-1760U relay actuator and isolated digital input card is a PC add-on card for the PCI bus. It meets the PCI standard Rev. 2.2 (Universal PCI expansion card), and works with both 3.3 V and 5 V PCI slots. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8 (Sink)
- **Input Voltage** Logic 0: 1.0 V max.
  Logic 1: 4.5 V min. (12 V max.)
- **Interrupt Capable Ch.** 8 (IDI0 ~ IDI7)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2 kΩ 1/4 W

Counter/Timer

- **Channels** 8
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 Hz
- **Isolation Protection** 2,500 V_{DC}
- **PWM Channels** 2
- **Digital Noise Filter** Min. effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
  Min. effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms

Relay Output

- **Channels** 8
- **Relay Type** 2 x Form C, and 6 x Form A
- **Contact Rating** 120 V_{DC} @ 0.5 A, or 30 V_{DC} @ 1 A
- **Relay on Time** 5 ms max.
- **Relay off Time** 5 ms max.
- **Life Span** 200,000 operations @ 0.5 A 120 V_{AC}
  500,000 operations @ 1.0 A 30 V_{DC}
- **Resistance** Contact: < 100 mΩ
  Insulation: 50 MΩ

General

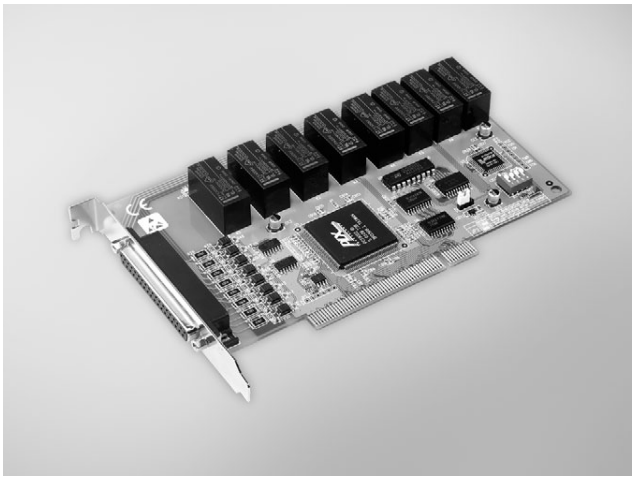
- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 450 mA
  Max.: 5 V @ 850 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68 - 2 - 1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **PCI-1760U** 8-ch Relay/IDI PCI Card w/ 10-ch Counter/Timer
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCI-1761

8-ch Relay and 8-ch Isolated Digital Input PCI Card



Features

- ISA-Compatible with PCL-725
- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 4 Form C and 4 Form A type relay output channels
- Male DB37 matching connector included
- Output status readback
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (3,750 V_{DC})
- High ESD protection (2,000 V_{DC})
- High over-voltage protection (70 V_{DC})
- Wide input range (10 ~ 50 V_{DC})
- Interrupt handling capability
- BoardID™ switch

Introduction

The PCI-1761 relay actuator and isolated DI card is an add-on card for the PCI bus. It provides 8 optically-isolated digital inputs with isolation protection of 3,750 V_{DC} for collecting digital inputs in noisy environments and 8 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The PCI-1761's eight optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials.

The PCI-1761 digital input channels feature a rugged isolation protection for industrial, lab and machinery automation applications. It durably withstands voltage up to 3,750 V_{DC}, protecting your host system from any incidental harms. If connected to an external input source with surge-protection, the PCI-1761 can offer up to a maximum of 2,000 V_{DC} ESD (Electrostatic Discharge) protection. Even with an input voltage rising up to 70 V_{DC}, the PCI-1761 can still manage to work properly, albeit for only a short period of time.

Specifications

Isolated Digital Input

Channels	8
Input Voltage	Logic 0: 3 V max. Logic 1: 5 V min. (50 V max.)
Interrupt Capable Ch.	8
Isolation Protection	3,750 V_{DC}
Overvoltage Protection	70 V_{DC}
Opto-Isolator Response	25 µs
Input Resistance	5,600 Ω
Input Current	1.6 mA @ 10 V_{DC}, 8.9 mA @ 50 V_{DC}

Relay Output

Channels	8
Relay Type	SPDT (4 x Form C and 4 x Form A)
Contact Rating	250 V_{AC} @ 3 A, or 24 V_{DC} @ 3 A
Relay on Time	15 ms max.
Relay off Time	5 ms max.
Life Span	2 x 10^7 operations
Resistance	Contact: 50 mΩ Insulation: 1 GΩ min.

General

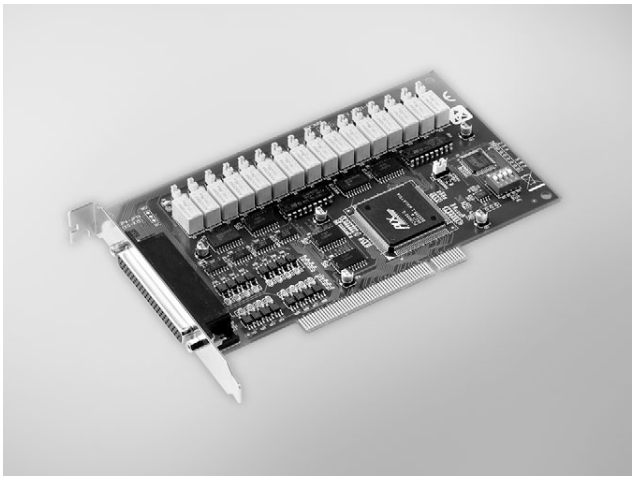
Bus Type	PCI V2.2
I/O Connectors	1 x DB37 female connector
Dimensions (L x H)	175 x 100 mm (6.9" x 3.9")
Power Consumption	Typical: 5 V @ 220 mA Max.: 5 V @ 750 mA
Operating Temperature	0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
Storage Temperature	-20 ~ 70° C (-4 ~ 158° F)
Storage Humidity	5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

PCI-1761	8-ch Relay/Isolated Digital Input PCI Card
PCL-10137-1	DB37 Cable, 1 m
PCL-10137-2	DB37 Cable, 2 m
PCL-10137-3	DB37 Cable, 3 m
ADAM-3937	DB37 DIN-rail Wiring Board
PCLD-880	Wiring Board w/ Two 20-pin Flat Cables & Adapter

PCI-1762

16-ch Relay and 16-ch Isolated Digital Input PCI Card



Features

- 16 relay output channels and 16 isolated digital input channels
- LED indicators to show activated relays
- Jumper selectable Form A/Form B-type relay output channel
- Output status readback
- Retain relay output values when hot system reset
- High-voltage isolation on input channels (2,500 V_{DC})
- High ESD protection (2,000 V_{DC})
- High over-voltage protection (70 V_{DC})
- Wide input range (10 ~ 50 V_{DC})
- Interrupt handling capability
- High-density DB62 connector
- BoardID™ switch

Introduction

The PCI-1762 relay actuator and isolated DI card is a PC add-on card for the PCI bus. It provides 16 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 16 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one red LED to show its on/off status. The PCI-1762's sixteen optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3 V max.
  Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 4.7 KΩ

Relay Output

- **Channels** 16
- **Relay Type** SPDT (Form A or Form B, jumper selectable)
- **Contact Rating** 0.5 A @ 125 V_{AC} or 1 A @ 30 V_{DC}
- **Relay on Time** 6 ms max.
- **Relay off Time** 4 ms max.
- **Life Span** 2 x 10^5 ops. min. (0.5 A @ 125 V_{AC}),
  5 x 10^5 ops. min. (1 A @ 30 V_{DC})
- **Resistance** Contact: 50 mΩ
  Insulation: 1,000 MΩ min. (at 500 V_{DC})

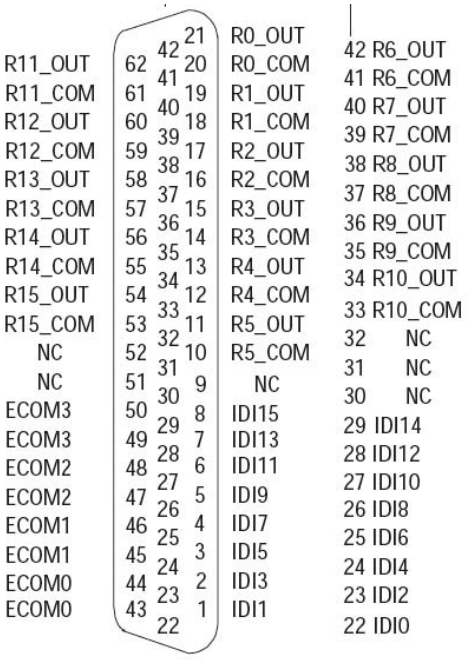
General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x DB62 female connector
- **Dimensions (L x H)** 175 x 100 mm (69" x 3.9")
- **Power Consumption** Typical: 5 V @ 250 mA
  Max.: 5 V @ 620 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 - 95 % non-condensing (IEC 68-2-3)

Ordering Information

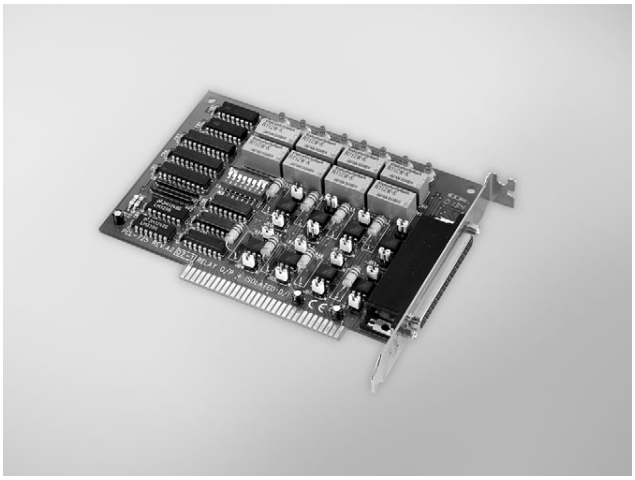
- **PCI-1762** 16-ch Relay/Isolated Digital Input PCI Card
- **PCL-10162-1** DB62 Cable, 1 m
- **PCL-10162-3** DB62 Cable, 3 m
- **ADAM-3962** DB62 DIN-rail Wiring Board

Pin Assignments



PCL-725

8-ch Relay and 8-ch Isolated Digital Input ISA Card



Features

- 8 x relay output channels and 8 x isolated digital input channels
- LED indicators to show activated relays
- 4 x Form C and 4 x Form A type relay output channels
- Male DB37 matching connector included
- Output status readback

Introduction

The PCL-725 relay actuator and isolated digital input card offers 8 relay actuators and 8 opto-isolated digital inputs on a single board.Typically, the onboard relays can serve as on/off control devices or small power switches. The 8 x opto-isolated DI channels are ideal devices for collecting digital inputs under noisy environment or floating potential. Also, the 8 x isolated inputs provide the best method to prevent any ground loop problems.

For easy monitoring, each relay is equipped with one red LED to reflect its on/off status. Each input channel is jumper selectable to either isolated or non-isolated input. Access to input and output channels is made possible through an onboard 37-pin D type connector.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** 5 ~ 24 V_{DC}
- **Isolation Protection** 1,500 V_{DC}
- **Input Resistance** 560 Ω
- **Input Current** 60 mA max.

Non-isolated Digiteal Input

- **Channels** 8 (Jumper-selectable)
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min. (5.25 V max.)

Relay Output

- **Channels** 8
- **Relay Type** SPDT (4 x Form C and 4 x Form A)
- **Contact Rating** 120 V_{AC} @ 0.5 A, or 30 V_{DC} @ 1 A
- **Relay on Time** 8 ms max.
- **Relay off Time** 8 ms max.
- **Life Span** 1 x 10^7 operations
- **Resistance** Contact: 50 mΩ
Insulation: 100 MΩ min.

General

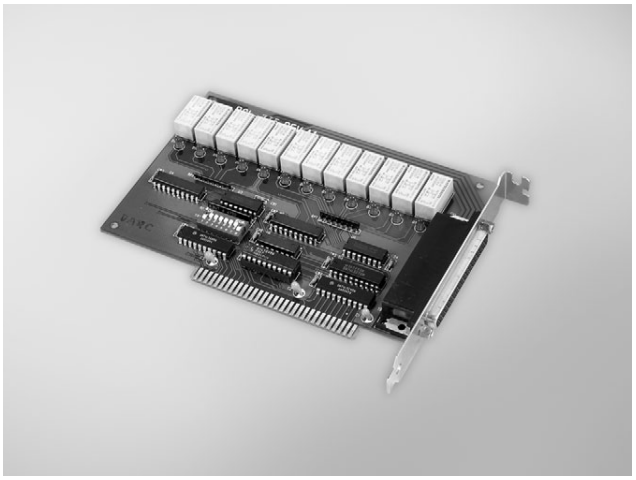
- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 147 x 100 mm (5.75" x 3.9")
- **Power Consumption** 5 V @ < 0.2 A; 12 V @ 33 mA for each relay
< 0.27 A if all eight relays are energized
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **PCL-725** 8-ch Relay/Isolated Digital Input ISA Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

PCL-735

12-ch Relay ISA Card



Features

- 12 relay outputs
- LED indicators to show activated relays
- Male DB37 matching connector included
- Output status readback

Introduction

Ideal for applications such as on/off control or signal switching, the PCL-735 12-channel relay actuator provides 12 SPDT relays on a half-size card. The on/off status of each relay is easy to monitor. A red LED next to each relay shows its on/off status, and the software can read each relay's status. An onboard DB-37 connector provides access to all output channels.

Specifications

Relay Output

- **Channels** 12
- **Relay Type** SPDT, Form C
- **Contact Rating** 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
- **Relay on Time** 5 ms typical
- **Relay off Time** 5 ms typical
- **Life Span** > 5 x 10^5 operations @ 30 V_{DC} and 2 A
  > 2 x 10^6 operations @ 30 V_{DC} and 1 A
- **Resistance** Contact: 50 mΩ
  Insulation: 1 GΩ @ 500 V_{DC} min.

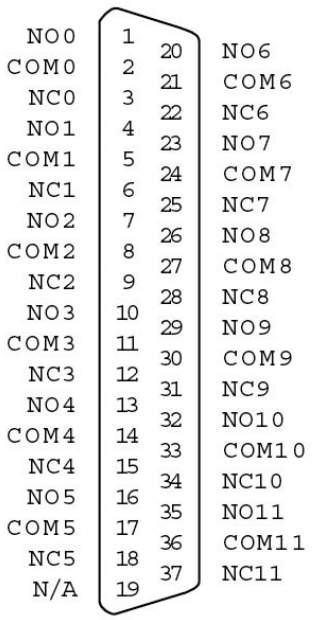
General

- **Bus Type** ISA
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 155 x 100 mm (6.1" x 3.9")
- **Power Consumption** Typical: 5 V @ 280 mA
  Max.: 12 V @ 200 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)

Ordering Information

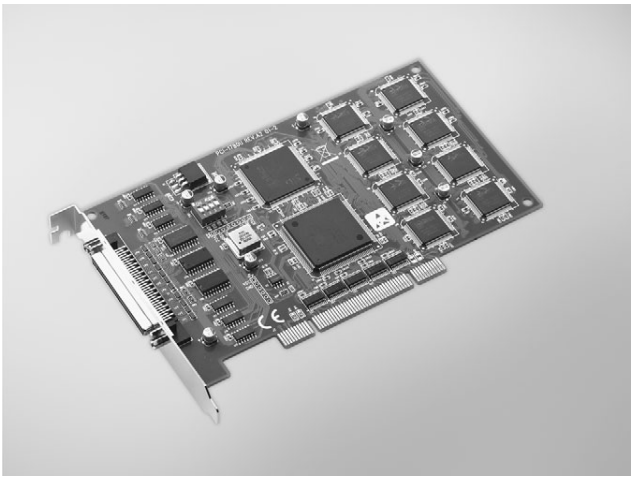
- **PCL-735** 12-ch Relay ISA Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments



PCI-1780U

8-ch, 16-bit Counter/Timer Universal PCI Card



Features

- 8 independent 16-bit counters
- 8 programmable clock source
- 8 digital TTL outputs and 8 digital TTL inputs
- Up to 20 MHz input frequency
- Multiple counter clock source selectable
- Counter output programmable
- Counter gate function
- Flexible interrupt source select
- BoardID™ switch

Introduction

PCI-1780U is a general purpose multi-channel counter/timer card for the PCI bus. It targets the AM9513 to implement the counter/timer function by CPLD. It provides eight 16-bit counter channels, 8 digital outputs and 8 digital inputs. Its powerful counter functions cater to a broad range of industrial and laboratory applications.

The card features 12 programmable counter modes, to provide one shot output, PWM output, periodic interrupt output, time-delay output, and to measure the frequency and the pulse width. The PCL-10168 shielded cable works well with PCI-1780U to reduce noise. Its wires are all twisted pairs, and the input signals and output signals are separately shielded, providing minimal cross talk between signals and the best protection against EMI/EMC problems.

Specifications

Digital Input

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** Ch. 0

Digital Output

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
Logic 1: 2.0 V
- **Output Capability** Sink: 24 mA @ 0.8 V
Source: -15 mA @ 2.0 V

Counter/Timer

- **Channels** 8 (independent)
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 20 MHz
- **Reference Clock** Internal: 20 MHz
External clock: 20 MHz max.
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 8
- **PWM Channels** 8

General

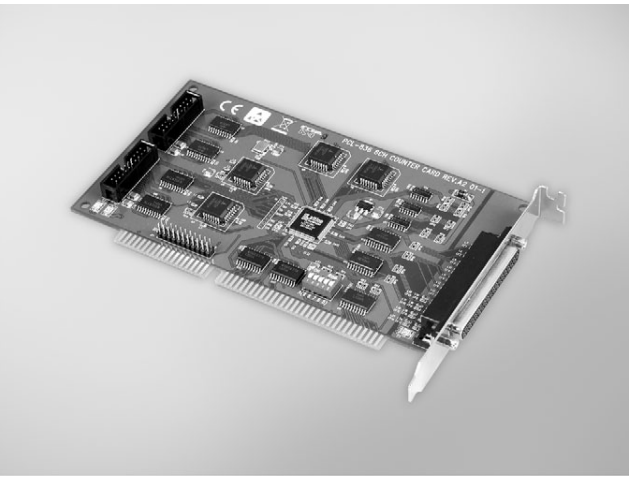
- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 900 mA
Max.: 5 V @ 1.2 A
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing (IEC 68-2-3)

Ordering Information

- **PCI-1780U** 8-ch, 16-bit Counter/Timer Universal PCI Card
- **PCL-10168-1** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCL-836

6-ch, 16-bit Counter/Timer ISA Card



Features

- Periodic interrupt generation
- 6 independent 16-bit counters
- Digital filter for noise reduction
- Binary or BCD counting
- Programmable frequency output
- Complex duty-cycle output
- Single-shot output
- 16-bit TTL input and 16-bit TTL output ports
- Selectable interrupt input channel
- Up to 10 MHz input frequency
- Pulsewidth and period measurement
- Time-delay generation
- F/V conversion and accumulation

Introduction

PCL-836 is a general purpose counter/timer and digital I/O card for PC/AT compatible computers. It provides six 16-bit counter channels. It also includes 16 digital outputs and 16 digital inputs. Two 8254 chips provide a variety of powerful counter/timer function modes to match your industrial and/or laboratory applications.

Unique Digital Filter

PCL-836 includes a unique digital filter to eliminate noise on the input signal. The frequency can be adjusted to provide more stable output readings.

Specifications

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V
- **Output Capability** Sink: 8 mA @ 0.8 V
  Source: -0.4 mA @ 2.0 V

Counter/Timer

- **Channels** 6
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External clock: 10 MHz
- **Counter Modes** 6 programmable counter modes
- **Interrupt Capable Ch.** IRQ 2, 4, 5, 7, 10, 11, 12, 15 (jumper selectable)
- **PWM Channels** 3
- **Digital Noise Filter** 1.6 ms to 52 ms (programmable)

General

- **Power Consumption** Typical: 5 V @ 360 mA
  Max.: 5 V @ 400 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 95% RH non-condensing (refer to IEC 68-2-3)
- **Connector** 1 x DB37 female connector for counter
  2 x 20-pin box header for digital I/O
- **Dimensions (L x H)** 185 x 100 mm (7.3" x 3.9")

Ordering Information

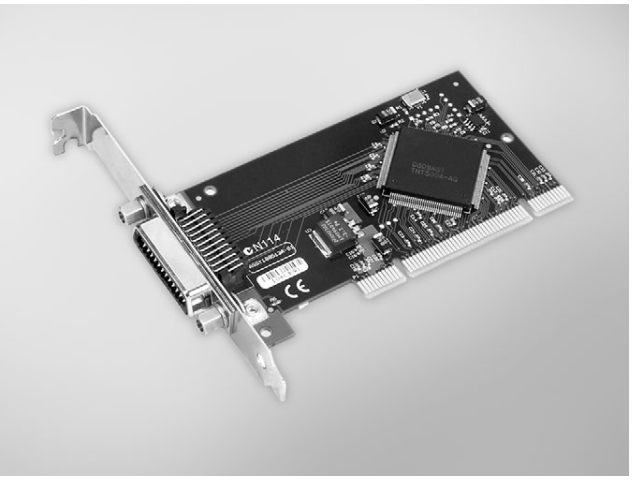
- **PCL-836** 6-ch, 16-bit Counter/Timer ISA Card
- **PCL-10137-1** DB37 Cable, 1 m
- **PCL-10137-2** DB37 Cable, 2 m
- **PCL-10137-3** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCLD-880** Wiring Board w/ Two 20-pin Flat Cables & Adapter

Pin Assignments

CLK1	1	20	OUT1
GATE1	2	21	GND
CLK2	3	22	OUT2
GATE2	4	23	GND
CLK3	5	24	OUT3
GATE3	6	25	GND
CLK4	7	26	OUT4
GATE4	8	27	GND
CLK5	9	28	OUT5
GATE5	10	29	GND
CLK6	11	30	OUT6
GATE6	12	31	GND
Interrupt Input	13	32	Interrupt Enable
PWM1	14	33	PWM2
PWM3	15	34	GND
Fout1	16	35	Fout2
Fout3	17	36	Fout4
Fout5	18	37	Fout6
+5V	19		

PCI-1671UP

IEEE-488.2 Interface Low Profile Universal PCI Card



Features

- IEEE 488.2 Standard interface
- Complete Talker/Listener/Controller
- Industry standard 32-bit PCI bus
- Data transfer rates over 1.5 MB/s
- 1,024-word FIFO buffer
- High-Speed State Machine Bus Manager
- 7 Interrupt lines, shared interrupt capability
- Transparent interrupt enabling/disabling
- Includes GPIB-Library software
- Low profile MD1 size

CE

Introduction

The PCI-1671UP IEEE-488 interface converts any PCI bus personal computer into an instrumentation control and data acquisition system. Connect up to 14 instruments using standard IEEE-488 cables such as the PCL-10488-2, 2 meter IEEE-488 interface cable. The PCI-1671UP transfers data over the GPIB at rates in excess of 1.5 million bytes per second using the maximum IEEE-488 specification cable length (2 meters times the # of devices). A 1,024-word FIFO buffer and the advanced REP-INSW ISR data transfer method provide the horsepower required to then transfer the data between the GPIB board and the host computer. The high-speed state machine also provides byte-to-word packing and unpacking, and because words carry twice the information that bytes do, packed data requires fewer bus cycles to transfer the same GPIB information.

The PCI-1671UP adheres to ANSI/IEEE Standard 488-1978. Often referred to as the IEEE-488.2 bus, GPIB bus or HP-IB bus, the GPIB (General Purpose Interface Bus) is a standard for instrumentation communication and control for instruments from manufacturers the world over. The GPIB provides handshaking and interface communications over an 8-bit data bus employing 5 control and 3 handshake signals. Equipped with PCI-1671UP, a personal computer can control GPIB instruments, gather data from GPIB test equipment, or become a data acquisition station in a GPIB system.

Specifications

GPIB

- **Compatibility** IEEE 488.1, 488.2
- **GPIB Transfer Rate** 1.5 MB/s
- **OS Support** Windows® 2000/XP
- **Library Support** Visual C++, Visual C#, Visual Basic, Visual Basic .NET, Delphi, LabView
- **Max. GPIB Connections** 15

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 24-pin IEEE 488
- **Dimensions (L x H)** 120 x 64 mm (Low profile MD1)
- **Power Consumption** 5 V_{DC} @ 375 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 158° F) @ 0-90% RH
- **Storage Temperature** -40 ~ 100° C (-40 ~ 212° F) @ 5-90% RH
- **Operating Humidity** 0 ~ 90% RH, non-condensing

Ordering Information

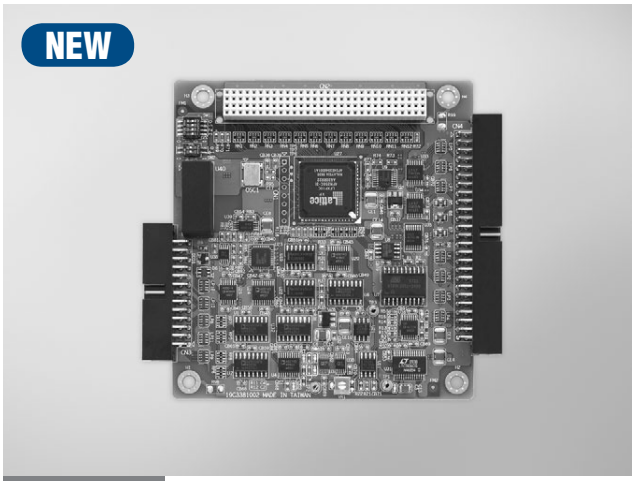
- **PCI-1671UP** High-perform. IEEE-488.2 Interface PCI Card
- **PCL-10488-2** IEEE-488 Cable, 2 m

PCM-3810I
PCM-3813I

250 kS/s, 12-bit, 16-ch Multifunction PCI-104 Module

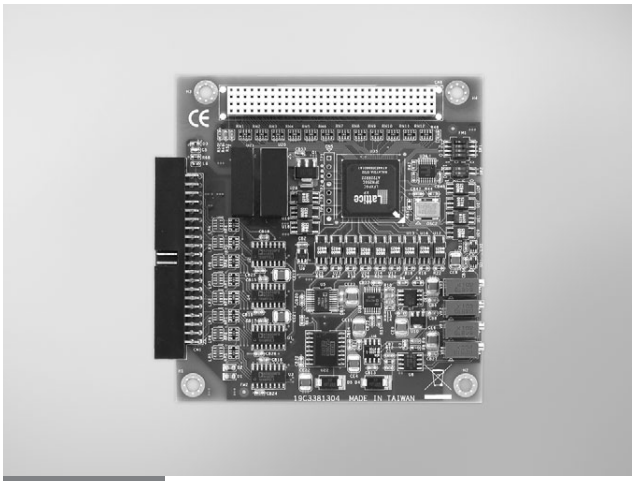
100 kS/s, 12-bit, 32-ch Isolated Analog Input PCI-104 Module

NEW



PCM-3810I

RoHS FCC CE



PCM-3813I

RoHS FCC CE

Specifications

Analog Input

- **Channels** 16 single-ended or 8 differential or combination
- **Resolution** 12 bits
- **Max. Sampling Rate** 250 kS/s
- **Ring Buffer Size** 4,096 samples
- **Input Range and Gain List**

Gain	0.5	1	2	4	8
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625

- **Input Protection** 30 Vp-p
- **Sampling Mode** Polling, pacer, double-clock, or external TTL trigger
- **Trigger Mode** Pre-trigger, post-trigger, delay-trigger, about-trigger

Analog Output

- **Channels** 2
- **Output Range** Internal Reference (V): 0 ~ 5, 0 ~ 10, ±5, ±10
  External Reference: 0 ~ +x V @ +x V (-10 ≤ x ≤ 10)
  -x ~ +x V @ +x V (-10 ≤ x ≤ 10
- **Resolution** 12 bits
- **Output Rate** 250 kS/s
- **Ring Buffer Size** 4,096 samples
- **Slew Rate** 20 V/μs
- **Operation Mode** Software polling, continuous out

Digital Input/Output

- **Channels** 16
- **Compatibility** 5V/TTL

Counter/Timer

- **Channels** 16
- **Resolution** 24 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 3
- **PWM Channels** 3

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 26-pin, 1 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~158° F)

Ordering Information

- **PCM-3810I** 250 kS/s, 12-bit Multi. PCI-104 Module
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

Features

- 32 single-ended or 16 differential analog inputs
- Programmable gain for each input channel
- Automatic channel/ gain/ SD scanning
- Onboard ring buffer (1,024 samples)
- Isolation protection (2,500 V_{DC})
- BoardID™ switch

Specifications

Analog Input

- **Channels** 32 single-ended or 16 differential or combination
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s
- **Ring Buffer Size** 1,024 samples
- **Input Range and Gain List**

Gain	0.5	1	2	4	8
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625

- **Input Protect** 30 Vp-p
- **Input Impedance** 100 MΩ/10pF (off); 100 MΩ/100pF (on)
- **Sampling Mode** Software polling, onboard programmable pacer, or external TTL trigger

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 40-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~158° F)

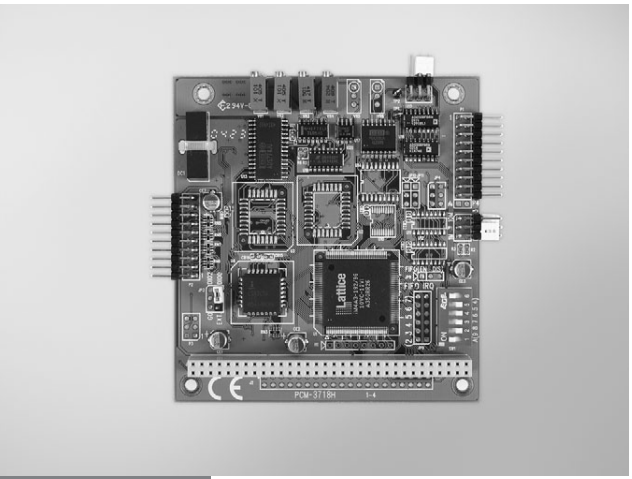
Ordering Information

- **PCM-3813I** 100 kS/s, 12-bit Isolated AI PCI-104 Module
- **ADAM-3937** DB37 DIN-rail Wiring Board

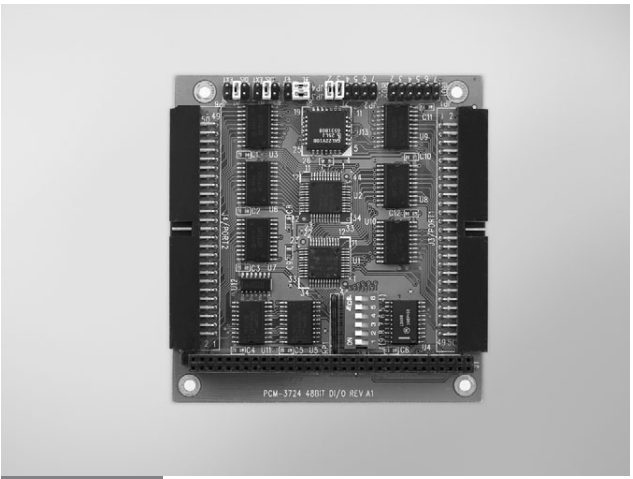
PCM-3718H/HG/HO
PCM-3724

100 kS/s, 12-bit, 16-ch Multifunction PC/104 Module

48-ch Digital I/O PC/104 Module



PCM-3718H/HG/HO



PCM-3724

Specifications

Analog Input

- **Channels** 16 single-ended / 8 differential
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 KHz* (DMA transfer)
  *80 kHz on P4-based (or upper) system
- **Input Impedance** 10 MΩ
- **Sampling Modes** Software, pacer or external
- **Input Range**

PCM-3718H and PCM-3718HO	Bipolar	±10, ±5, ±2.5, ±1.25, ±0.625
	Unipolar	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
PCM-3718HG	Bipolar	±10, ±5, ±1, ±0.5, ±0.1, ±0.05, ±0.01, ±0.005
	Unipolar	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01

Analog Output (PCM-3718HO only)

- **Channels** 1 (12 bits)
- **Output Range**

Internal Reference	Unipolar (V)	0 ~ 5, 0 ~ 10
External Reference (V)		0 ~10, 0 ~ -10

- **Slew Rate** 10 V/μs
- **Output Impedance** 0.1 W max.

Digital Input/Output

- **Channels** 16, 5V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.33 V max. @ 6 mA
  Logic 1: 3.84 V min. @ 6 mA

General

- **Bus Type** PC/104
- **I/O Connectors** 2 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 180 mA
  Max.: 5 V @ 400 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -40 ~ 85° C (-40 ~ 185° F)

Ordering Information

- **PCM-3718H** 100 kS/s, 12-bit Multi. PC/104 Module
- **PCM-3718HG** 100 kS/s, 12-bit High-gain Multi. PC/104 Module
- **PCM-3718HO** 100 kS/s, 12-bit Multi. PC/104 Module w/AO
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m

Features

- 48 TTL digital I/O lines
- Supports dry contact and wet contact
- Keeps the I/O port setting and DO state after system reset
- Output status read-back
- Channels simulate 8255 PPI mode 0
- Interrupt triggering, rising/falling edge

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max. @ 6 mA
  Logic 1: 2.0 V min. @ -6 mA

General

- **Bus Type** PC/104
- **I/O Connectors** 2 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** 5 V @ 90 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -40 ~ 85° C (-40 ~ 185° F)

Ordering Information

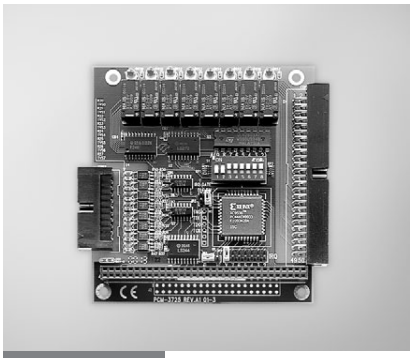
- **PCM-3724** 48-ch Digital I/O PC/104 Module w/ 50-pin Cable
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m

PCM-3725
PCM-3730
PCM-3780

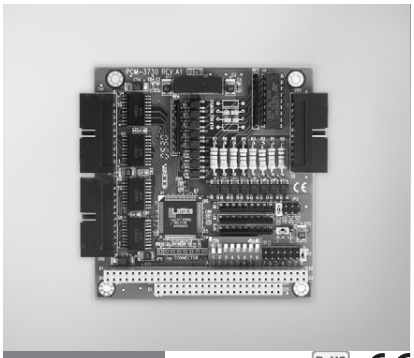
8-ch Relay and Isolated Digital Input PC/104 Module

16-ch Isolated Digital I/O PC/104 Module

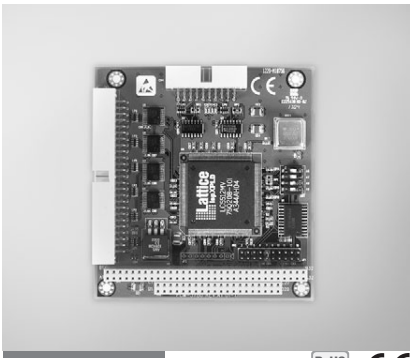
2-ch Counter/Timer with 24-ch Digital I/O PC/104 Module



PCM-3725



PCM-3730



PCM-3780

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3 V
  Logic 1: 10 V (50 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 4.7 KΩ

Relay Output

- **Channels** 8
- **Relay Type** SPDT (Form C)
- **Contact Rating** 30 V_{DC}@ 1.5 A
- **Relay on Time** 4 ms
- **Relay off Time** 4 ms
- **Life Span** 100,000 min @ 2 A/30 V
- **Resistance** Contact: 100 mΩ
  Insulation: 1 GΩ @ 500 V_{DC}

General

- **Bus Type** PC/104
- **I/O Connectors** 1 x 20-pin head for IDI
  1 x 50-pin head for relay
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 100 mA
  Max.: 5 V @ 280 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-cond.

Ordering Information

- **PCM-3725** 8-ch Relay/Isolated Digital Input PC/104 Module
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables

Specifications

Digital Input

- **Channels** 16, 5 V/TTL
- **Interrupt Capable Ch.** 4

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 2 V max.
  Logic 1: 5 V min. (24 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 0.1 ms
- **Input Resistance** 2 kΩ @ 0.5 W

Digital Output

- **Channels** 16, 5 V/TTL
- **Output Capability**
  Sink: 8 mA @ 0.5 V max.
  Source: -0.4 mA @ 2.4 V min.

Isolated Digital Output

- **Channels** 8
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-Isolator Response** 100 µs

General

- **Bus Type** PC/104
- **I/O Connectors** 3 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 330 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Humidity** 5 ~ 95% RH, non-cond.

Ordering Information

- **PCM-3730** 16-ch Isolated DI/O PC/104 Module w/ 20p Cable
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-780** Screw Terminal Board w/ Two 20-pin Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables

Specifications

Digital Input

- **Channels** 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.4 V min.
- **Interrupt Capable Ch.** 24

Digital Output

- **Channels** 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage**
  Logic 0: 0.5 V max. @ 24 mA (sink)
  Logic 1: 2.4 V min. @ 15 mA (source)

Counter/Timer

- **Channels** 2
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 20 MHz
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 2

General

- **Bus Type** PC/104
- **I/O Connectors** 1 x 50-pin box header
  1 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 300 mA
  Max.: 5 V @ 0.8 mA
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Operating Humidity** 5 ~ 85% RH non-cond.

Ordering Information

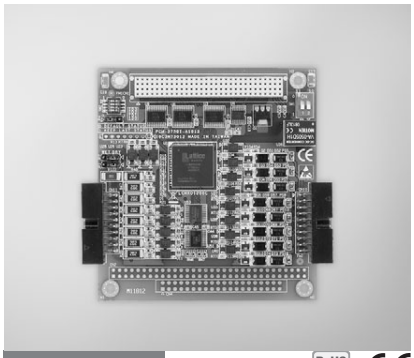
- **PCM-3780** 2-ch Counter/Timer, DI/O, PC/104 Module w/Cables
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

PCM-3730I
PCM-3753I
PCM-3761I

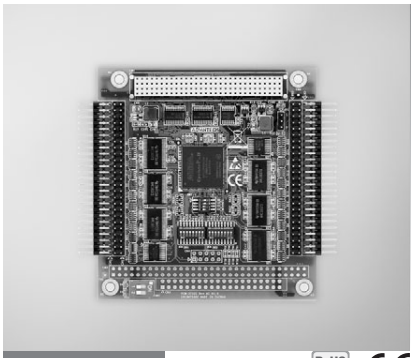
32-ch Isolated Digital I/O PCI-104 Module

96-ch Digital I/O PCI-104 Module

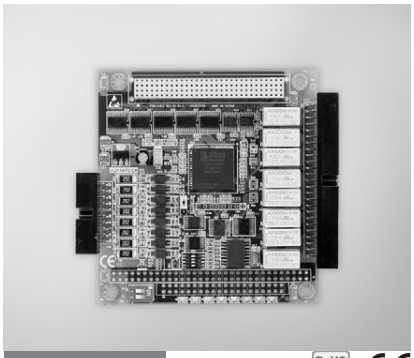
8-ch Relay and 8-ch Isolated Digital Input PCI-104 Module



PCM-3730I



PCM-3753I



PCM-3761I

Features

- High-voltage isolation on both input and output channels (2,500 V_{DC})
- High output driving capacity
- Interrupt handling capability
- Keep digital output values after system reset

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 5 V min.
30 V max.
- **Input Current** 2.5 mA @ 5 V
15 mA @ 30 V
- **Input Resistance** 2 kΩ
- **Isolation Voltage** 2,500 V_{DC}
- **Over Voltage Protection** 70 V_{DC}
- **Opto-isolator Response Time** 25 µs
- **Interrupt Capable** All channels

Isolated Digital Output

- **Channels** 16
- **Output Voltage Open Collector** 5 ~ 30 V_{DC}
- **Output Sink Current** 200 mA max.
- **Isolation Voltage** 2,500 V_{DC}
- **Over Current Protection** 1.6 A per 8 channels
- **Opto-isolator Response Time** 25 µs

General

- **Bus Type** PCI-104
- **I/O Connectors** 2 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Temperature** -50 ~ 120° C (-58~248° F)

Ordering Information

- **PCM-3730I** 32-ch Isolated Digital I/O PCI-104 Module
- **ADAM-3920** 20-pin DIN-rail Wiring Board
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m

Features

- Supports dry/wet contact
- Keeps the last output value after system hot reset
- Interrupt handling capacity
- "Pattern match" and "change of state" interrupt functions
- Output status read-back
- Interrupt output pin for simultaneously triggering external devices

Specifications

Digital Input/Output

- **Channels** 96 (bi-directional)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 24 mA
Source: 2.4 V @ 15 mA

General

- **Bus Type** PCI-104
- **I/O Connectors** 4 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** -20 ~ 70° C (-4 ~ 158° F)
- **Storage Temperature** -50 ~ 120° C (-58~248° F)

Ordering Information

- **PCM-3753I** 96-ch Digital I/O PCI-104 Module w/ 50p Cable
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Features

- 8 Form C type relay output channels
- Retained relay output values when hot system reset
- High-voltage isolation on input channels (2,500 V_{DC})
- Wide input range (5 ~ 30 V_{DC})
- Interrupt handling capability

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 5 V min.
30 V max.
- **Input Current** 2.5 mA @ 5 V
15 mA @ 30 V
- **Input Resistance** 2 kW 0.5 W
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **Interrupt Capable** All channels
- **Opto-isolator Response Time** 25 µs

Relay Output

- **Channels** 8
- **Relay Type** DPDT, Form C
- **Contact Rating** 240 V_{AC} @ 0.25 A,
or 30 V_{DC} @ 1 A
- **Relay on Time** 5 ms max.
- **Relay off Time** 4 ms max.
- **Life Span** 1 x 10^7 @ 6 V/100 mA
- **Resistance** Contact: < 50 mW
Insulation: 1 GW min.
(at 500 V_{DC})

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 50-pin, 1 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60° C (32 ~ 140° F)
(refer to IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70° C (-4 ~ 158° F)

Ordering Information

- **PCM-3761I** 8-ch Relay/Isolated Digital Input PCI-104 Module
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCL-10150-1.2** 50-pin Flat Cable, 1.2 m
- **PCL-10120-1** 20-pin Flat Cable, 1 m
- **PCL-10120-2** 20-pin Flat Cable, 2 m